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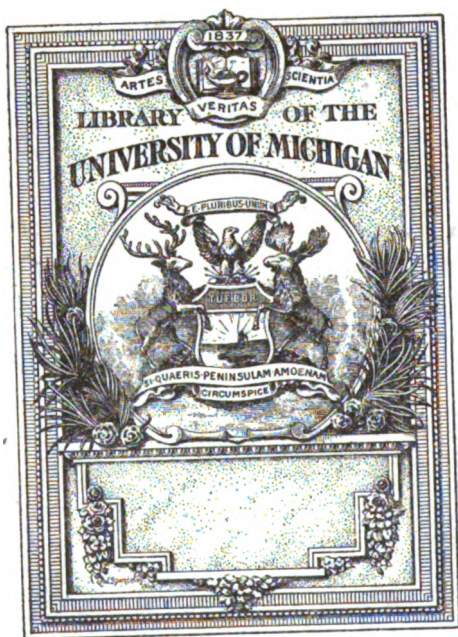
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THE
MEDICAL CHRONICLE:

A MONTHLY RECORD OF THE

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THE MEDICAL CHRONICLE:

A MONTHLY RECORD OF THE

Progress of Medical Science.

SOME PRACTICAL REMARKS ON FOREIGN BODIES IN THE UPPER AIR AND FOOD PASSAGES AND ON THE PRINCIPLES OF THEIR REMOVAL.

By **FELIX SEMON, M.D., F.R.C.P.,**

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Laryngological Society of London.

HAVING been honoured by an invitation to contribute a short paper on some practical subject to the **MEDICAL CHRONICLE**, I do not think I can choose a better theme than the one indicated by the above title. In my own practice I have found the responsibility in these cases frequently so great, and the advice given by previous medical advisers so different from my own ideas on the subject, that it may not be amiss to briefly state in the following paper my general principles in diagnosing and treating these cases, without, of course, aiming at any complete treatise on this large subject.

In the first place, I beg to state, as the practical outcome of my experience in this class of cases, that in the large majority of the patients who have consulted me for impaction of foreign bodies in the upper air and food passages the foreign body at the time of the consultation was no longer there, and that it was only a persistent after-sensation which induced the sufferers to believe that it was still actually present. The remaining sensations of soreness, pain, pricking, or of the actual presence of the foreign body in this class of cases, apparently last much longer than after impaction of foreign bodies in other sensitive parts—such as, *e.g.*, in the eye—and it is most desirable for the practitioner to know that,

N. ., Vol. III., No. 1, APRIL, 1895.

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in spite of the most positive statements, even of educated persons, to the effect that they were quite sure the foreign body itself was still present, it may long have passed down, leaving only most vivid and persistent after-sensations behind. This applies particularly to foreign bodies which have been impacted in the pharynx, the tonsils, and the upper part of the œsophagus ; and I shall, in the conclusion of this paper, give a very instructive instance of the ease with which one may be misled in these cases by the positive statements and assertions of the patient.

Whilst thus simply stating the actual results of my own experience, I wish, on the other hand, to strongly insist on the absolute necessity of arriving at a diagnosis of a persisting after-sensation, though the foreign body itself had already passed, only after most careful examination of all parts in question, and after positive exclusion of the possibility of the foreign body being still actually impacted. It is a most undesirable thing for any practitioner to console a patient with the assurance that the foreign body had actually passed down, whilst another adviser afterwards discovers that it is still present and removes it. Now, as to the examination of the parts under such circumstances, I wish to urge as a general principle that it should under all circumstances be begun by inspection with a good light, and not by the introduction of the finger or of an instrument into the throat. Palpation, though it may become, and often enough is, indispensable when inspection has failed, labours under the great disadvantage that if one has to do with small pointed foreign bodies, particularly with fishbones (which, individually speaking, are no doubt the class of foreign bodies most frequently met with in the throat), or with pins and needles, one may actually drive the still projecting small part quite into the tissues whilst making one's examination, and thereby greatly aggravate the difficulty of, if not entirely frustrate attempts at, subsequent extraction. This obtains particularly in cases in which small fishbones, pins, needles, etc., are impacted in the tonsils.

For the same reason it will be desirable, if the employment of cocaine be necessary on account of great irritability of the structures, to apply the drug in the form of a spray, and not by means of a brush, as the touch of the latter may effect the same mischief which has just been named as a possible consequence of the introduction of the finger.

In inspecting the throat by means of a good light the examination should be made very methodically, and should not be limited to the one part of the throat in which, according to the patient's belief, the foreign body is supposed to be still impacted. I have recently on another occasion¹ insisted on the fact that the power of localisation of sensations felt

¹ "The sensory throat neuroses of the climacteric period."—*British Medical Journal*, Jan. 5, 1895.

in the throat is very defective, and that the sensations in the most different parts of the organs of the neck are, as a rule, jointly referred to a region in which, so to say, the joint sphere of sensations in the throat is situated. This region is the front part of the neck, the laryngo-tracheal region (Gottstein). From personal experience I was able to adduce an instructive instance met in my own person, in which the sensations caused by a piece of partridge-bone impacted in my throat were felt at a distance of about two to three inches from the spot where it was in reality impacted. This shows the absolute necessity of a really methodical examination. A patient may positively state, as I did then, that the foreign body was impacted in the region of the larynx, whilst in reality it stuck in the posterior wall of the pharynx behind the uvula, and an observer who, trusting such statements, only examines the laryngeal region, neglects inspection of the pharyngeal and naso-pharyngeal cavity, and assures his patient that the foreign body is no longer present, may have the mortification of hearing afterwards that a subsequent adviser had actually removed the foreign body from an unsuspected region.

Particular care should be taken when the foreign body is stated to be a fishbone; when deeply impacted in the tissues, so that only a small part projects, it is sometimes extremely difficult to discover it, the more so as strings of tenacious saliva, which extend from one part of the throat to the other, often closely simulate it. In such cases examination with the probe, under the guidance of good light, and, if necessary, of the laryngoscope, ought to establish the actual existence of the supposed body in the tissues before an attempt is made at introducing forceps or other instruments for removal. In a case quite recently under my observation I looked for fully half an hour, and touched any amount of such strings of saliva, until I finally felt just the end of what proved to be a rather large fishbone sticking out of one of the tonsils. Also, in the cases of foreign bodies supposed to be impacted further down, a laryngoscopic examination always ought to precede the introduction of bougies or other instruments for diagnosis by touch and for removal.

Coming now to the question of treatment, two principles, I feel convinced, ought to guide the practitioner in cases of impaction of foreign bodies in the upper air and food passages, viz :—

(1) No foreign body, the presence of which has been actually detected, ought to be allowed to remain impacted, even if at the time it does not produce any serious symptoms; and (2) no attempt should ever be made to ram an angular or pointed foreign body forcibly down.

With regard to the first of these two principles, I wish to observe that but too frequently foreign bodies, which shortly after their impaction cause slight symptoms or none at all, may later on be the source of

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most serious troubles. Thus in the nose it is found time after time that rhinoliths, which give the greatest trouble in removing, are traced to the impaction of a small foreign body, which forms the nucleus of the new formation, many years previous to the time when first nasal complaints arose. In the larynx a foreign body may cause, after originally giving but little trouble, subsequently perichondritis and lasting disablement of the organ, or it may, after having remained in the larynx for some time, become dislodged and fall into the lower air passages, causing there most serious disease. In the œsophagus it may after some time either perforate the walls or lead to the formation of a pouch. All these contingencies are too serious to contemplate the impaction of a foreign body in these parts, even if at first unattended by serious symptoms, with indifference. I have myself seen and described examples of such occurrences. Thus in one case described in the "*Transactions of the Clinical Society*," Vol. XVI., p. 138, a pin which had remained thirteen months in the larynx of a boy, and had at first given rise to but slight and occasional symptoms, later on caused periodical attacks of perichondritis, with pain, difficulty in deglutition, attacks of choking and temporary fixation of the corresponding crico-arytænoid joint until it was removed. In another case the impaction of a walnut shell in the larynx which, it is true, had at once caused dyspnoea and necessitated tracheotomy, but which had been allowed to remain in the larynx for a considerable time, ultimately produced almost general perichondritis and ankylosis of the left crico-arytænoid articulation, together with general narrowing of the larynx, which was but little relieved when at last thyrotomy was performed and the shell removed. In a third case, the specimen of which I recently showed at a meeting of the Laryngological Society of London, impaction of a coin in the œsophagus led to the formation of a large diverticulum in that part. These instances could be easily multiplied, but those adduced show, I think, the reality of the dangers involved in allowing foreign bodies to remain in the upper air or food passages, and justify the principle which I have put at the head of this division.

Not less important is the second one, which I have ventured to emphasise in introducing this part of my paper. No pointed or angular foreign body, wherever situated in the upper air or food passages, ought ever to be forcibly rammed down. Self-evident as this principle ought to be, I find it is frequently sinned against; and, indeed, with some practitioners, the very first idea, when they hear of the impaction of a foreign body in these parts, appears to be to take some bougie or similar instrument, and to push it down. [At the same time, it must in fairness be stated, that, as the case communicated in conclusion of this paper will show, the patients' statements with regard to what has been done must

be received with a good deal of caution.] The danger of such proceedings is obvious enough ; a fishbone or other bone, a pin, a needle, a tooth-plate, a broken shell, etc., might, by the adoption of this plan, not merely become more firmly impacted than it had previously been, and might offer, consequently, much more difficulty to extraction ; but may, particularly when it is small, be in its whole length driven into the tissues, and entirely disappear from view, or it might even perforate the part in which it had been first impacted, and set up most serious mischief in its neighbourhood.

A few recent experiences of my own illustrate this point very forcibly. In one case, a piece of mutton, to which a large fragment of bone was attached, stuck in the œsophagus, apparently about opposite the cricoid cartilage, of a young woman, and could not be spontaneously dislodged. The practitioner first called in, immediately, so I was informed, took a bougie and attempted to push the foreign body down, although he was distinctly told that a piece of bone was attached to the meat. He only succeeded in moving the foreign body very slightly further down, and the proceeding caused intense pain and some bleeding. When I saw the patient on the next day, there was considerable œdema of the mucous membrane covering the lower part of the cricoid cartilage, and of the lateral walls of œsophagus, and the patient continued to bring up blood-stained phlegm. The foreign body itself was below the line of vision, and it was only after many fruitless attempts that I finally succeeded in extracting, by means of suitable forceps, a large piece of meat to which a sharp piece of bone, nearly an inch and a half in length, was attached. The latter, on the pointed part, was covered with blood, no doubt due to laceration of the œsophagus, and although the patient made a good recovery, the act of swallowing remained painful for a considerable time afterwards.

Even more serious were the events in a second case which recently came under my observation. A young Roman Catholic nun, who wished to attend Cardinal Newman's funeral, was taking her luncheon very hurriedly when she felt a piece of bone sticking in her throat (she was eating rabbit pie). She did not succeed in dislodging it, and in the afternoon a practitioner was called in. This gentleman, I am informed, attempted to push the foreign body down without ever ascertaining by inspection where it was situated. His attempt caused immediate sharp pain, and the patient's voice, which up to that time had remained normal, suddenly became extinguished. The pain remained constant, difficulty in swallowing set in, and after a little while she became feverish in the evenings. As I have described this case already in full before the Laryngological Society of London,* I need merely say that

* "Proceedings," 1893, p. 39.

perichondritis of the thyroid cartilage supervened, that thyrotomy had to be performed in the middle of the acute stage at St. Thomas's Hospital by Sir William MacCormac, and that extensive necrosis of the left ala of the thyroid cartilage was discovered. On a probe being introduced into a fistulous tract leading into the interior of the cartilage itself, an abscess cavity was entered, in the midst of which a piece of bone was found. This was examined by Mr. Shattock, and declared to be a piece of rabbit bone. The patient made a good recovery, but her voice has remained permanently impaired.

In a third case a small child swallowed a halfpenny, and afterwards suffered from great difficulty in deglutition. The practitioner called in introduced an œsophageal bougie, and told the parents that he had pushed the coin down into the stomach. It was, however, never found in the fæces, and the child continued to emaciate and to have an aversion against food. When, six weeks afterwards, I cautiously passed a small bougie, I introduced this without difficulty into the stomach, and did not feel anything abnormal, but when, after this, I introduced a parasol-probang and brought it up extended, I found in the lower part of the œsophagus a distinct resistance on one side, and on cautiously using the probang as a lever, suddenly felt something give way, and brought up the coin, which had been impacted laterally with the rim downwards, and had, no doubt, gravely interfered with the contractions of the œsophageal muscles.

Cases such as this show, I venture to believe, most drastically, the danger of the ramming-down process, and justify my warning against it.

As to the manner in which foreign bodies ought actually to be removed when impacted in the upper air passages, no dogmatic rules, it is needless to say, can be laid down, and the practitioner will have to be guided in each case by (1) the nature and size of the foreign body, and (2) the locality in which it has become lodged. In cases in which it is fixed in the nose, in the majority of instances it will, of course, be desirable to remove it through the anterior nares by slender forceps, and, if possible, under the guidance of inspection. The plan sometimes suggested, viz., to syringe forcibly some fluid through the opposite nostril, with a view of washing it away, cannot be recommended, on account of the danger which the forcible injection of fluids into a nostril entails for the ears, the fluid easily entering under such circumstances through the Eustachian tubes into the middle ears, and setting up acute otitis media.* It will be desirable, previous to attempts at extraction, to apply a strong cocaine solution to the nostril in question, not merely with a view of

* The actuality of this danger is not, I believe, nearly enough realised by many practitioners although attention has been drawn to it more and more frequently and earnestly of late years.

diminishing the pain, but also of availing oneself of the deturgescient and ischæmising powers of that drug, whereby better inspection and easier removal will be rendered possible.

In cases of impaction of foreign bodies in the pharynx and nasopharyngeal cavity again forceps with indented blades will in most instances be the most suitable instrument, the curve of the forceps being adapted to the locality of impaction.

When the foreign body has passed down into the larynx, or into the lower air passages, and when its form is round, such as in the case of coins, beans, peas, etc., previous to any instrumental interference it is always worth while to try inversion and forcible shaking of the patient; this plan may even be adopted when the foreign body is pointed or angular. In a most remarkable case which has been described by my colleague, Mr. Pitts,* and which I had the privilege of watching throughout, an earring, which had first become impacted in the larynx just below the vocal cord, and a few days afterwards had got detached from there and fallen into the left bronchus, was spontaneously evacuated by coughing about an hour after inversion and shaking had been, apparently unsuccessfully, tried. Should the foreign body be fixed in the larynx itself, and should its nature be such as to allow of the hope of removing it by intra-laryngeal operation without damaging the part, this plan of treatment will, of course, be preferable to an external incision. Should it, however, be either too large or too irregular to justify such attempts, and should it additionally cause dyspnoea, tracheotomy might first be performed, and an attempt be made to get hold of it through the tracheotomy wound, or to dislodge it from the larynx into the pharynx, where it can, of course, more easily be grasped; or thyrotomy may, if this should fail, be at once superadded to the tracheotomy, and the foreign body thus removed.

The same obtains of foreign bodies of large size and angular nature in the trachea. In a recent case in which a man was brought in an apparently dying state from suffocation to St. Thomas's Hospital, and in which tracheotomy had to be performed at once to save his life, I diagnosed by subsequent laryngoscopic examination a large foreign body low down in the trachea. On my suggestion the tracheal wound was dilated, and the foreign body—an instrument used by the patient, a ventriloquist, to imitate animals' voices—was removed. The patient made a complete recovery. This case, by the way, also well illustrated the necessity of thinking of foreign bodies when an obscure swelling is seen in the air or food passages, even though no history of the impaction

* "St. Thomas's Hospital Reports." New Series. Vol. XVIII., 1888, p. 201.

of such be obtainable. The patient, when the diagnosis had been made, was closely questioned as to the possibility of the impaction of a foreign body, but strenuously denied this, and only remembered, after it had been successfully removed, that nearly two years previously he had swallowed one of his instruments.

In cases in which the foreign body is situated in one of the bronchi, tracheotomy, followed by an attempt at extracting the offending substance by means of a very long slender forceps, is advisable. Sir William MacCormac, some time ago, succeeded in removing from the right bronchus a tooth forceps which, in the course of an operation, had broken off and had penetrated into the lower air passages. If the foreign body cannot be extracted at the time of the operation itself, it will be desirable not to insert a tracheotomy tube, but to keep the tracheal wound open by means of stitches in the trachea attached to an elastic band carried from the two sides of the wound posteriorly round the neck, so that in the event of the foreign body becoming subsequently dislodged it can be easily expectorated through the open wound during the act of coughing.

With regard to the impaction of foreign bodies in the œsophagus, the instrument with which I have succeeded in dislodging the foreign body in most cases which have come under my notice is the parasol-probang. In a few cases it was necessary to employ the coin catcher. Only when one is *quite certain* that a foreign body is of a rounded and soft nature, do I consider it justifiable to attempt to push it further down into the stomach. When it has already penetrated into the stomach the best plan is always to give the patient plenty of starchy food, such as porridge, lentils, potatoes, etc., in order to envelop it in the food-pulp, and thus to facilitate its passage through the bowels. Quite recently the two years' old child of a distinguished surgeon swallowed a pointed pencil fully 2½ in. in length. By the adoption of the last-named plan this large foreign body passed without causing any difficulties or pain within 36 hours through the whole intestinal canal of this small child.

I need only say that extraordinary cases may also demand extraordinary measures; that if, for instance, a large toothplate is firmly impacted in the upper part of the œsophagus and can by no internal operation be extracted, œsophagotomy may become necessary; that, if it has passed further down and remains in the stomach without being able to pass through the pylorus, gastrotomy may be required, etc. But if the principles sketched in this paper be followed, I feel sure that in the great majority of all cases that come under observation it will be possible to obtain by milder means a satisfactory result.

In conclusion I cannot do better than illustrate the difficulties one

sometimes meets with in these cases, and the caution with which the patients' statements must be received, than by the following case, which quite recently occurred in my practice.

A lady, who had already previously consulted me, came to me with the statement that she had ten days previously swallowed a fishbone, that this had stuck in her right tonsil, but at first not given her any inconvenience. Some days afterwards, however, it began to cause pain, and her medical adviser, according to her most positive statement, had seen and at once attempted to extract the foreign body, but, failing this, had pushed it down. She now experienced very severe pain in the right side of the throat, corresponding to the region to which, as stated at the beginning of this paper, throat sensations are usually referred, viz., the laryngo-tracheal region. It seemed to me very extraordinary, indeed, that any one should allow a fishbone to remain uninterfered with in one's throat for so long a time, and I cross-examined her with a view of ascertaining whether really the period of impaction had been so long, but her statements remained most positive and did not vary. On inspection nothing abnormal could be seen in the pharynx, larynx, and upper part of the œsophagus; but, as the patient stated that the foreign body was now further down than where I would be able to see it, I introduced the parasol probang. This passed easily down, and in its extended form also upwards, but when the parasol came near the laryngeal region in its upward passage I felt a distinct resistance on the front wall of the œsophagus, and the patient, by gesticulation, implied that it was there where the sensations were felt. The resistance was very strong, and I did not succeed in dislodging anything. When finally withdrawn, the horsehairs forming the front part of the parasol were distinctly bent downwards. Renewed attempts were not crowned with better success. I then tried the coin catcher. This, too, met with a distinct resistance, which seemed to lie across the front wall of the gullet at the spot indicated, and even stuck there so firmly that, as I could not dislodge the supposed foreign body, I had to push the instrument a little further down and to turn it, in order to be able to withdraw it. I then refused to make any further attempts on that day, ordered the patient to live for a few days on cold and fluid food only, to suck ice frequently, and to take bromide of potassium, and told her that unless her sensations disappeared it would be desirable to have a consultation on the subject, and, if necessary, to repeat the attempt under an anæsthetic. Four days afterwards the patient re-appeared, stating that she felt sure that the foreign body was still there, but that through my attempts at removal it had been dislodged considerably towards the left, and that the greatest pain was now felt on the left side. She also complained of increased pain in swallowing. A consultation was held

10 *Semon on Foreign Bodies in Air and Food Passages.*

with Mr. Butlin, who agreed that it was best not to irritate the gullet afresh by introduction of instruments so soon after the previous attempts, but that, if the pain should continue, a few days afterwards an examination should be made under an anæsthetic.

This examination took place a week after my first endeavours, Mr. Butlin and the patient's general adviser, Mr. K., being present, and Mr. Tyrrell giving chloroform. According to the patient's statements, her sufferings had meanwhile further increased. Whilst the patient was put under chloroform, Mr. K. made the very surprising statement that he had *never* seen nor felt the foreign body, nor had he attempted to push it down! This statement, which absolutely contradicted the patient's own account, further corroborated a suspicion which I had already previously entertained, viz., that the resistance which I had felt was due not to the impaction of the fishbone across the throat, but simply to an unusual prominence into the gullet of the lower border of the cricoid plate. The narcosis having been completed, I introduced the parasol-probang again, and on withdrawing it felt a resistance exactly in the same place in which I had encountered it a week before. Mr. Butlin and Mr. K. convinced themselves of its existence, but neither was able to move it the least bit, and both gentlemen agreed that it was most probably the lower border of the cricoid which gave a sensation of a foreign body.

This was the last I saw of the patient. She afterwards consulted, I was informed, Mr. Thomas Smith, who was reported to have told her that he did not think that the foreign body was there any longer, and even if it were that it would not do her any harm. Meeting Mr. Smith a few days afterwards, I asked him what he thought of the case, and he replied that since I (!) had pushed down the foreign body he did not think it could be there any longer. On my naturally protesting against being credited with a practice which, as seen in this paper, nobody can more strongly condemn than I do, I learned that the patient had—just as positively as in the first place she had given her statement to me—told him that I had pushed the foreign body down! I am glad to say that, so far as I have heard, the lady continues to do well, but the case teaches in more than one respect such important lessons that I thought it should be recorded.

UTERINE CURETTING.

By D. BERRY HART, M.D., F.R.C.P.E., Edinburgh.

THE operation of curetting the uterus in certain conditions to be specified shortly, has not taken the position in this country that it deserves. For this there are various reasons. The most prominent is the quite unwarrantable importance attached to backward displacements of the uterus. This displacement is too often considered quite sufficient to explain a patient's menorrhagia and leucorrhœa, the fact being that it has little influence, if any, in their production. Profuse menorrhagia is, apart from fibroids, usually due to endometritis, and the only thorough remedy for this is curetting. There is no doubt too that it is easier to replace the uterus and insert an instrument, in the hope that all will go well, than to curette; but if the practitioner carefully notes the result he will in most cases find the displacement recur, and the symptoms remain unchecked. Another hindrance to curetting in suitable cases has been the *dictum* so strongly held by many, that chronic inflammatory thickenings, nonsuppurative, in the connective tissue, tubes, or ovaries, contra-indicate treatment of an operative nature on the cervix or endometrium. If endometritis be present in cases requiring such interference the inflammatory peri-uterine conditions must, according to the routine belief, be cured first by the hot douche and tampon before the idea of any operative treatment can be entertained. The reason for the preliminary care is the opinion that the old inflammatory mischief may be stirred up unless such palliative treatment is first employed. This precaution arose, however, in pre-antiseptic days, before the thorough antiseptic and aseptic treatment of wound surroundings was applied to gynæcology, and is, I believe, an unnecessary one. The dominance of uterine displacements in gynæcological pathology also misled one in another class of cases, viz., in those where a profuse menorrhagia or even metrorrhagia existed, with nothing apparently but a retroflexion of a somewhat enlarged uterus to account for it. No pessary cures this, but curetting does. The condition is one of fungous endometritis, and curetting gives marvellous results. I wish, therefore, to draw special attention to two classes of cases where curetting is highly useful, and gives either a complete cure or greater amelioration of the menorrhagia than any other treatment. These are: (1) *The chronic case in minor gynæcology where there is some enlargement of the uterus, often backward displacement, and usually peri-uterine thickenings, non-suppurative; with pain, menorrhagia, and leucorrhœa as its prominent symptoms.*

All gynaecologists will recognise this case as one of the most common in gynaecology, and for it I have suggested the term of a "chronic infected case." It is one to which the practitioner should specially direct his attention.

The history usually is that the patient's symptoms came on after an abortion or labour, and was practically a minor septic attack. The physical examination for its recognition is the bi-manual, or better, the recto-vaginal bi-manual. If this be carefully performed with the patient in the dorsal position, the knees well drawn up, and the abdominal parietes slack, the conditions I have mentioned can be easily made out.

The lesions are multiple, and the first point is to disentangle them and settle what "view" is to be taken of the case. The commonest view is that the backward displacement is the primary lesion to be treated, and that with replacement the untoward symptoms will vanish. I wish to urge, however, that the real nature of the case is a minor infection, septic in its nature, occurring after abortion or labour, and that the endometritis and peri-uterine thickenings resulted from that at the time, and have become ameliorated but persistent. The order of treatment should be, curetting for the endometritis first, and then the treatment of the thickenings, if they still remain, afterwards. Cervical splits I neglect unless hypertrophy is present, and then I amputate the cervix immediately after the curetting.

(2) *The case wherein profuse menorrhagia occurs, and the uterus, displaced or in normal position, has a thickened and vascular endometrium.* In this case the uterus is always enlarged, and indeed may be so large as to make one suspect sarcoma or malignant disease. On examining the scrapings removed, thin-walled vessels are found in the connective tissue, but no epithelial penetration into it.

Method of Operation.—The patient is chloroformed and placed in the lithotomy posture. The vulva is shaved and thoroughly washed with soap and water, and finally with boiled water and corrosive sublimate 1—2,000. The vagina and cervix are similarly treated.

The next steps are to dilate the cervix, to curette the uterus, wash it out with a double catheter, and finally apply pure carbolic acid.

The instruments needed are Hegar's dilators, a sound, modified Sims's speculum with a broad blade, a volsella, and scoop-curette.

All these instruments, except the dilators, should be boiled before the operation in a one per cent carbonate of soda solution and placed, when cool, in carbolic lotion (1—30). It is sufficient to soak the dilators in carbolic lotion (1—20) for half an hour before use.

The operator's hands should be thoroughly cleansed with soap and hot water, then rinsed in boiled water, and finally thoroughly brushed with corrosive sublimate 1—2,000.

These precautions are essential to success, and should on no account be omitted.

The speculum having been passed, the anterior lip of the cervix is laid hold of with a volsella, and the uterus drawn down. By means of the sound, the uterine position is now carefully ascertained, the length of the cavity measured, and then the dilators passed. One should begin with the size that passes readily, and then go on using the succeeding sizes until an amount of dilatation is attained equal to the calibre of the index finger, and thus one that allows the passage of such a curette as Martin's. While the curette is being passed it should feel quite loose in the cervix, as this ensures delicacy of touch and enables one to feel resistance quite distinctly when the fundus is reached. Cases have been recorded where the uterus wall has been perforated, and serious mischief ensued. This, however, could only happen with extreme carelessness, or where the curette was passed through a rigid cervix and the necessary delicacy of touch lost.

The curette is then employed to scrape the uterine walls, anterior and posterior. A grating sound should be heard while this is being done. Sometimes it is advantageous to exercise counter pressure with the finger through the vagina on the anterior and posterior walls if the point of the curette does not seem to press sufficiently on the wall. One's object is to remove the mucous membrane down to the muscular coat. There is no fear of removing it all, as one cannot help missing certain parts at the fundus, and, in addition, the glands dip down between the muscular fibres in many places and serve for regeneration. Washing out with corrosive sublimate (1—4,000) by means of a double catheter, and application of pure carbolic acid on an armed sound completes the operation.

A much more difficult point to settle is the after treatment. It is best to curette immediately after the unwell time, or even on the last day of the period, so as to ensure easier dilatation (Braithwaite). This gives one also a longer time to apply astringents to the cavity, so as to restrain the vascularity of the regenerating mucous membrane. This should be done on the third and tenth day at any rate, and should consist in the application of pure carbolic acid on an armed sound, the parts having been carefully cleansed and douched first. Our knowledge is still defective as to what happens after curetting, but in a recent communication by Professor Werth*, of Kiel, some interesting facts have been brought forward.

Professor Werth examined six uteri after extirpation, where on various days before the operation he had curetted the mucous membrane. He

* "Zur Regeneration der Uterusschleimhaut nach Ausschabung." *Centr. für Gynäk.*, No. 7, 1895.

found the curette removed varying thicknesses at different places, and that at the fundus and sides of the uterus, parts were not removed at all. On the anterior wall the muscularis was occasionally found wounded. In the two uteri curetted five days before operation, he found the mucous membrane regenerated, the glands fully formed, and no defects in the superficial epithelium. Fibrous connective tissue was more abundant than the cellular elements, but the former underwent a hyaline degeneration, and large spindle cells appeared in its place about the tenth day. We do not know as yet how the application of caustics modifies this process.

The immediate results of this treatment are usually excellent, but it may require to be repeated. In none of the many cases I have practised it have I had any bad result, either minor or major; and I can, therefore, recommend this procedure strongly in properly selected cases. If mischief should arise, it is not the stirring up of an old lesion, but the introduction of some septic infection at the time of operation.

Clinic.

MANCHESTER ROYAL INFIRMARY.

ACUTE DIABETES DUE TO CANCER OF THE PANCREAS.

Under the care of Dr. J. DRESCHFELD.

MARY H., aged 41, was admitted as an inpatient into the Infirmary, November 16, 1894, and died November 25.

Previous History.—The patient's health was fairly good until two months before admission. About that time she suddenly began to suffer from severe sharp shooting pains in the epigastrium. Next day the pain extended to the flanks as well as to the centre of the abdomen, and the patient vomited twice. The pain continued more or less until about two weeks previous to admission; since that time it has not been so troublesome. About one week before admission the patient first noticed swelling of the abdomen. There has been no jaundice, no vomiting (since that at the onset), and no hæmatemesis. The bowels have been regular. The patient has gradually become anæmic, but there has been no epistaxis or loss of blood in any way. The patient admitted that previous to her illness she had somewhat freely partaken of stimulants.

Condition on Admission.—Patient is anæmic; there is no jaundice tinge of the face. She appears fairly well nourished still; she states

that she was formerly very stout, but has lost flesh considerably during the last two months. The abdomen is greatly enlarged (partly owing to the great amount of subcutaneous fat), the girth at the umbilicus is 48in. There is dullness in the flanks, the level of which varies with the position of the patient, also an indistinct thrill can be obtained. In the epigastrium, about two inches above the umbilicus, an ill-defined resisting ridge can be felt. The tongue is clean; appetite impaired; the bowels are regular. Pulse 108, regular, fairly compressible, arterial wall normal. The examination of the heart and lung reveals nothing abnormal. The knee-jerks are present, and there are no signs of affection of the nervous system.

Urine.—Amount small (36oz.), specific gravity 1047, acid, no albumen, large amount of sugar present. Perchloride of iron gives a deep brown-red colouration (Gerhardt's reaction). There is a marked reaction for acetone (Legal's test). The urine contains twenty grains of sugar to the ounce.

November 20.—Patient feels very sick. Vomiting on three occasions in the morning. Repeated vomiting in the evening. The vomited matter is dark and frothy.

November 21.—Constant vomiting. No food can be taken.

November 23.—Vomiting continues. Urine contains twenty-four grains of sugar to the ounce.

November 24.—Frequent vomiting still continues.

November 25.—A considerable quantity of blood vomited. Death from syncope.

Autopsy.—Body markedly anæmic. Abdomen distended. No œdema of legs. On opening the abdominal cavity it was found to contain a large quantity (several pints) of bloody fluid, the colour being a little darker (i.e., having a browner tint) than that of venous blood. Examination of the cavities and organs of the thorax revealed only slight and unimportant changes. The stomach was opened along the greater curvature, but was found to be empty. No trace of hæmorrhage into the stomach cavity could be detected, but at one point the stomach wall was pushed forwards (i.e., bulged into the stomach cavity), and this bulging was felt to be due to the presence of some resisting mass behind the stomach. Over this part the gastric mucous membrane was intensely congested. On opening the omental cavity it was found to be filled with a thick mass of blood clot and detritus. This extended upwards behind the stomach. The pancreas was very firm and densely infiltrated with new growth, which at parts was almost of cartilaginous consistency. A fibrous stroma could be seen ramifying in the growth. At some parts the pancreatic duct contained thick, mortar-like material. In the head of the gland were three branched, irregular, friable white calculi, each a

little larger than a pea. Near the middle of the gland were two large calculi, of similar colour and consistence; one about the size and shape of a date stone, the other about three-quarters of an inch long, and bent at right angles at one end. A large number of smaller calculi, varying in size from a pea to a pin's head, were scattered through the gland. The calculi were embedded in the dilated pancreatic ducts and their branches. Little or no normal pancreatic tissue could be detected. The pancreatic growth extended in the most irregular manner into the surrounding parts at the posterior wall of the abdomen. It extended upwards behind the stomach, and caused the bulging seen on the posterior surface of the gastric mucous membrane. Also on the serous surface of the posterior wall of the stomach was a diffuse mass of new growth, which extended towards the cardiac end of the organ. This growth was infiltrated with blood. The pancreatic growth also extended to the spleen on the one side, and on the other it extended to the portal vein, which it compressed but did not infiltrate. Superficially the growth was very soft and vascular. The pylorus and duodenum were not invaded by the growth.

The large omentum was much infiltrated with fat, and presented numerous deposits of secondary growth. There were also secondary nodules in the gastro-hepatic omentum. The intestines were not infiltrated with growth.

The liver was small; the surface smooth; on section, pale. There was no evidence of cirrhosis, and several small secondary deposits of new growth were found. The gall bladder was normal.

The spleen was slightly enlarged. The kidneys pale, but normal on section. On the serous surface of the uterus were several nodules of new growth.

Microscopical examination showed that the growth was carcinoma, the firmer parts presenting the appearance of scirrhous.

The case presents several points of interest :—

(1) The symptoms on admission simulated those of cirrhosis of the liver, there being marked ascites, and the ill-defined mass, with resisting ridge, could easily be taken for an enlarged liver and a somewhat enlarged spleen. The presence of sugar in the urine is not of unusual occurrence in cirrhosis, and in this case no increased thirst was noticed, and there was only a small quantity of urine passed. The amount of sugar and the high specific gravity, however, clearly pointed to diabetes rather than glycosuria.

(2) Though the urine contained both aceto-acetic acid and acetone, and repeated and persistent vomiting occurred during the short stay of the patient in the hospital, there were no signs of diabetic coma, and death was due to syncope from the large amount of blood vomited.

(3) In most cases of acute pancreatic diabetes large quantities of urine are passed, and the thirst is much increased. Both symptoms were absent in this case.

(4) The excessive hæmorrhage which had taken place into the omentum, and which at first sight resembled a large hæmorrhagic cyst, is of rare occurrence in cancer of the pancreas.

A CASE OF ACUTE INTESTINAL OBSTRUCTION FROM IMPACTION OF A GALL STONE IN THE JEJUNUM.

By J. W. SMITH, M.B., F.R.C.S.,

Late Resident Surgical Officer, Manchester Royal Infirmary.

THE patient, a woman, 63 years of age, was admitted to the Manchester Royal Infirmary late in the evening of May 30th, 1894. The previous history did not throw much light on the condition from which the patient was suffering. She denied having ever had any previous attack of abdominal pain, or having been troubled with any form of "indigestion." She had, however, lost flesh very considerably during the preceding eighteen months; but, with the exception of slight bronchial attacks, had for many years enjoyed good health. The present attack commenced on May 24 (six days before admission to hospital) with abdominal pain, which came on suddenly after dinner. This was followed in a short time by vomiting. The bowels had been moved that morning, but there was no motion subsequently. On the following day patient felt sickly and ill all day, but it is uncertain whether she vomited. The pain, however, continued, and became more severe on the third day, when vomiting also recurred. On the fourth day vomiting began early in the morning, and continued incessantly during the fifth and sixth days until the time of her admission, and had latterly been stercoraceous. Several enemata had been administered, which only brought away small hardish fæcal masses.

When I examined her immediately after admission she said the pain had not been nearly so severe during the day—as previously—and she had not vomited for six hours. She had the typical facies of acute intestinal obstruction with prolonged vomiting, a thickly coated tongue, foul smelling breath, and a quick feeble pulse.

The abdomen was uniformly distended, and everywhere tympanitic. The abdominal fat was somewhat thick—and no individual coils of intestine could be seen—nor was vermicular motion perceptible. No

tumour could be felt, but the lower left segment of the abdomen seemed somewhat more resistant than the rest. The rectum contained some hard faecal masses high up, but there was no growth to be felt.

On consideration of these symptoms, and taking into account the preceding loss of flesh, it was thought most probable that the obstruction was due to the impaction of a faecal mass at some point of the large intestine, which had been narrowed by a new growth of a malignant nature. Two castor oil enemata were given at intervals, each of which brought away a quantity of faecal matter.

Next morning the patient was seen by Mr. Hardie, into whose ward she had been admitted, and as the general condition was becoming manifestly worse—two attacks of stercoraceous vomiting having occurred in the interval—it was decided to open the abdomen. Mr. Hardie being unable to remain asked me to undertake the operation, and it is by his kind permission that I am able to publish this record of the case.

The incision for a left iliac colotomy was made, and on opening the peritoneal cavity a considerable quantity of fluid escaped. The sigmoid flexure, brought out of the wound, was found to be collapsed. On exploring the abdominal cavity I could discover no signs of a growth connected with the intestine; a very hard pedunculated myoma could be felt attached to the fundus of the uterus, but there was no adhesion of bowel to it. A coil of small intestine was pulled out of the wound and found to be distended almost to the calibre of the ordinary stomach, its walls being much thinned and greatly congested. After following down the intestine for some distance, a hard mass inside the gut was brought up into the wound. This, when the coil containing it was brought outside the abdomen, was found to be a rounded body $1\frac{1}{2}$ in. long, blocking the gut, which immediately below was contracted and empty, so that whilst the intestinal wall could be moved on the body, it seemed impossible to push it downwards along the intestine. The coil of bowel was therefore protected by hot guards, clamped, and a longitudinal incision made along its free margin over the body. This, when removed, proved to be a rounded somewhat conical gall stone, forming a cast of the interior of the posterior two-thirds of the gall bladder, the narrower end being rough and nodular, the broader end having three flattened polished facets, manifestly for contact with smaller stones occupying the fundus of the gall bladder. When dried it weighed half an ounce, length $1\frac{1}{2}$ in., circumference $3\frac{3}{4}$ in.

The intestinal incision was sewn up by a double row of Lambert's sutures; the coil, having been carefully cleansed, was returned into the abdomen, and the parietal incision sutured. The operation occupied half an hour.

During the first hour afterwards the patient vomited *feculent* matter several times, but was not sick subsequently. In five hours there was a free motion of the bowels, consisting of fluid, with some pieces of formed *feces*. One hour after this she was quite conscious and free from pain, but still much collapsed—pulse 135, very feeble and irregular. Seven hours after the operation she became suddenly worse, and died almost immediately.

The post-mortem examination was made by Dr. Kelynaek, who reported: "On opening the abdominal cavity no fluid or gas escapes. The peritoneum covering the small intestine is much congested. The peritoneum in the neighbourhood of the liver is thickened and matted, and fixes the liver to the adjoining abdominal wall, diaphragm, duodenum, and stomach. The duodenum is closely adherent to the under surface of the liver and gall bladder. Stomach, normal in size, is much pulled up and adherent to the diaphragm and liver. In the duodenum, $1\frac{1}{2}$ inches below the pylorus, there is a fistulous communication between the gall bladder and the anterior wall of the first part of the duodenum. The fistulous opening, which is of considerable size, leads immediately into the gall bladder, which contains two facetted gall stones, a third small facetted stone lying in the fistulous opening. The gall bladder is shut off from communication with the bile duct by occlusion of the cystic duct. The common bile duct and hepatic duct are patent. Liver—congested—shows slight indication of biliary distension of one or two larger ducts. No cirrhosis or suppuration. Intestines—congested—upper part of jejunum distended. About the middle of the jejunum the intestine has been sutured along the line of its free edge, 4cm. in length, by a double row of disconnected sutures. The union is complete. The lumen at this point is somewhat contracted, the intestine below being also contracted. No ulceration of the mucous membrane at the seat of operation. Kidneys—Right, normal; left, pelvis and calyces much distended, especially the former; ureter not markedly distended. Renal substance atrophied. No stone. Uterus is the seat of multiple fibroids."

The rarity of intestinal obstruction from the impaction of a gallstone is shown by the statistics of Mr. Mayo Robson, given in his paper on this subject before the Royal Medical and Chirurgical Society, in January.* He says that "in answer to questions addressed to the members of the staff, or the registrars of a number of large metropolitan and provincial hospitals, he had received communications from institutions representing about 80,000 patients, and out of this number only four cases of intestinal obstruction from gall stones had been recorded during the past twelve months." The case here recorded is one of this number. The subject was

* *Lancet*, January 26, 1895, p. 220.

also discussed at the Clinical Society about the same time, when Mr. F. Eve described a successful case of removal of the stone by laparotomy.*

It seems to be generally admitted that it is always difficult, and in many cases impossible, to diagnose cases of this kind. In the present case there was entire absence of any previous epigastric pain, which might have suggested the ulceration of a gall stone into the intestine. It is noteworthy how closely the patient's age agrees with the average, for in the 27 cases hitherto recorded as collected by Mr. Eve the mean age was 64.

As to the question of operation, it is obvious that in many cases, owing to the difficulty of diagnosis, the condition is only revealed on the performance of an exploratory laparotomy, as in the present case. Where the diagnosis can be made independently the advisability of operation is open to some doubt. Mr. Eve advises expectant treatment, but thinks that operative interference should not be long delayed. Mr. Hutchinson thinks that "even in cases where death is threatening, the chances of recovery are about equal to those of a fatal issue if operation be decided against." Mr. Eve's statistics of operation show that of 9 cases operated before 1889 only one recovered; subsequently to this date, of 18 cases operated on 9 recovered. In this case it seemed to us that a fatal termination was inevitable unless some relief could be afforded by operation. As to the method of dealing with the stone when found at the operation there was, I think, no doubt that it ought to be extracted by an incision into the gut; for, owing to the contracted condition of the intestine below the point of obstruction and the size of the stone, it was quite impossible to push it onwards into the large intestine. Taking into consideration the age of the patient, the duration and acute nature of the symptoms, and the fact that one of the kidneys was completely disorganised, the fatal termination of the case is scarcely to be wondered at.

CHRONICLE.

Medicine.

THE RELATION OF MEDICINE TO CYCLING.

CYCLING is now one of our most popular pastimes. It is limited by but few restrictions. Both sexes at nearly all ages practise it. It is a very convenient means of locomotion, and within the reach of most, for

* *Lancet*, January 19, 1895, p. 156.

either pleasure or profit. It is fashionable and serviceable. But attractive and delightful as the use of the wheel may be, it cannot be denied that it may have a very appreciable influence upon both normal and morbid processes. It may undoubtedly prove a fruitful agent for good or evil—a valuable aid to health or an important factor in the ætiology of disease.

The relation of cycling to medicine has recently been attracting the attention of medical men, not only in this country* but in other parts of the world, especially in America† and France‡.

The present standpoint may be very briefly summarised in the following paragraphs:—

Cycling in Health.—The difference between the immediate and after effects are to be carefully distinguished. The use of the wheel tells most distinctly on the heart, producing a marked quickening of the pulse. The effort may be so extreme as to cause the rise from 65 or 75 to 200 beats per minute. Usually it slows down, but a quickened cardiac action continues as long as the cyclist is riding. Sir Benjamin Richardson suggests that this quickened movement accounts for the remarkable journeys a fully trained cyclist can undertake, and explains his endurance without sleep.

Healthy persons differ greatly as regards age, temperature, strength, and powers of endurance; and these factors, as well as the important one of sex, must be fully recognised by the medical adviser when considering the rational use of the bicycle for any individual.

Few attempts have hitherto been made to study the physical development of persons who have been using the bicycle properly for years. Hammond§ has, however, recently published the results of his examination of a number of cyclists.

In fourteen amateurs who had ridden a bicycle from five to thirteen years, travelling from 5,000 to 27,000 miles, he found simple cardiac hypertrophy without dilatation, and a breathing capacity above the average. A careful examination of fourteen celebrated professional bicyclists failed to show any deformity of the spinal column, though this is popularly supposed to result from the bad posture of riding with the

* Discussion at the Medical Society of London.—*Brit. Med. Journ.*, Jan. 19, 1895: *Lancet*, Jan. 19, 1895.

† Discussion at the New York Obstetrical Society.—*The American Journal of Obstetrics and Diseases of Women and Children*, Jan., 1895; and Discussion at the New York Academy of Medicine.—*Medical Record*, Feb. 2, 1895.

‡ Discussions at l'Académie de Médecine.—*Le Progrès Médical*, Sept. 8, 15, 1894; and Discussion at Congrès de l'Association Française pour l'avancement des Sciences.—*Le Progrès Médical*, Aug. 25, 1894.

§ Hammond (Græme M.). "The influence of the bicycle in health and in disease."—*Medical Record*, Vol. XLVII., No. 5, p. 129. Abstract in *The Medical Week*, January 4, 1895.

legs at right angles to the body. All had excessive hypertrophy of the thigh and abdominal muscles, cardiac hypertrophy without dilatation, and, except in two instances, a lung capacity above the average.

Well-regulated cycling appears to increase the breathing capacity of the average man, and by a better oxygenation of the blood beneficially influences the proper performance of the various organic functions of the body. Both professional and amateur riders, however, seem to acquire the unnecessary and undesirable habit of mouth-breathing.

The muscular system of the bicyclist is usually well developed, and there is no reason to believe that the muscles of the legs are developed at the expense of the rest of the body.

Cycling in Disease.—A well-regulated use of the bicycle is not to be denied to all physical weaklings. In many morbid conditions it may even prove of very considerable therapeutic value. In some cases of cardiac dilatation, slight valvular involvement, and degeneration of the heart muscle, carefully supervised riding on level surfaces may be of great benefit. Richardson wisely points out that it is often more important to consider the peripheral than the central condition of the circulation, inasmuch as enfeebled or worn-out arteries may be more dangerous than the feeble heart, and when connected with a heart that is overacted are seats of danger. Sansom looks upon properly directed cycling as a good means of treating valvular disease, and points out that it has the advantage over Oertel's plan of being a less monotonous form of graduated exercise than climbing mountains or stairs. Certainly some persons can ride with the greatest comfort who could not mount a flight of stairs without dyspnoea and palpitation.

Varicose veins may also sometimes be relieved by properly-regulated cycling. No one suffering from any lesion or functional derangement of the heart should be allowed to cycle, except under the direction of his physician, after a thorough physical examination.

Cycling is also very beneficial in the management of many neurotic states, especially neurasthenia and hysteria, but riding in crowded thoroughfares should be forbidden, as it often, in timid persons, leads to prejudicial disturbance of the cardiac action. In the treatment of insomnia it is frequently useful. Gynæcologists have found cycling advantageous in relieving local pelvic congestion. Carefully regulated cycling may be advantageous in certain affections of the respiratory organs, such as latent phthisis, and possibly in some forms of asthma. In cases of functional dyspepsia and constipation, gout, diabetes, and general anæmia, much benefit has followed a cautious and restricted use of the wheel.

Dangers of Cycling.—In addition to the comparatively slight risks of accident, cycling is undoubtedly an unsuitable and even dangerous

form of exercise for certain individuals. Richardson has never seen a sudden death from cycling, but several cases have been recorded. Petit* reports three cases.

Robin† found albumen was increased by cycling in the case of a man with atheromatous vessels and renal sclerosis.

The irrational cycling met with in severe races and long distance rides tends to render the heart irritable and hypersensitive to motion. An increase in size is produced, which is rather of the nature of a dilatation than a healthy hypertrophy.

The effect of cycling on children needs to be observed. It is possible that unless carefully regulated, abnormal cardiac conditions may result.

Genito-urinary affections may certainly be induced or aggravated in certain cases by cycling. This, however, is generally the result of a badly adjusted saddle or faulty posture. The rider should sit on the gluteal muscles and free the perineum from all pressure. In neither sex is there any need for irritation of the genitals. A long saddle is desirable for females, and suitable riding costume is an essential. For both sexes care should be taken that there be no elevation in the peak of the saddle, and that its parts are of a resilient nature. A pneumatic saddle may prove beneficial. A suitable suspensory bandage is also sometimes serviceable for male cyclists. Long-continued use of the ordinary leather saddle may lead to superficial hardness and rigidity of the labia majora, local pain, and, according to some, vulvitis.

It is important to remember that a gonorrhoeal inflammation of the urethra has been re-awakened by the continuous pressure of unsuitable saddles. Jumping upon or breakdown of the saddle has been known to produce considerable urethral injury, rupture occurring in several cases. Riding over rough roads on unsuitable machines may lead to functional disturbances of the bladder.

The influence of cycling as an ætiological factor in the production of lesions of the perineal region has been specially drawn attention to by Ferria,‡ Rousing,§ and de Pezzer.||

Tremulousness of the hands and sometimes teno-synovitis at the wrists were formerly met with, but the introduction of pneumatic tyres and the improvements in the saddle and its springs have practically done away with such conditions.

* PETIT. "Morts subites en vélocipède."—*Le Progrès Médical*, Sept. 8, 1894.

† ROBIN. "Bicyclette et albuminurie."—*Gazette des Hôpitaux*, Oct. 25, 1894.

‡ FERRIA. *Gazzetta Medica di Torino*, December 13, 1894.

§ ROUSING. *Hosp. Tidende*, February 7, 1894.

|| DE PEZZER. *Ann. de Malad. des Org. Gen. Urin.*, January, 1894. See Abstract, *Practitioner*, March, 1895.

A considerable number of morbid conditions have been stated to be the outcome of cycling, such as*—hemiplegia, hysteria, palpitation, tachycardia, angina, dilated heart, pulmonary congestion, bronchial catarrh, varicose veins of the legs, hæmorrhoids, varicocele, hæmatoma of the abdominal walls, muscular spasms and inflammations, hernia, cystitis, prostatitis, urethritis, orchitis, and synovitis. Such and the like might readily arise in connection with the ill-conducted pursuit of many other forms of exercise, but they can hardly be considered as in any way special to cycling.

There are many conditions where cycling would prove a dangerous form of exercise. Each case must be dealt with individually by the physician. As a general rule, the following may be considered as contra-indications :—Arterio-sclerosis, tuberculosis, emphysema, extensive valvular disease, asthma, affections of the abdomen and pelvis, obesity, epilepsy, and chronic affections of the joints and muscles.

Regulation of Cycling.—In all doubtful cases the physician's advice should be sought. All exercise should be well within the powers of the rider. Fast and long distance riding, especially in adolescents, is to be condemned. Straining to climb hills or to meet head winds is decidedly injurious. Excessive fatigue is always to be avoided. Light judiciously selected meals at frequent intervals are necessary. The use of alcohol, meat extracts, and such stimulants as coca is to be prohibited.

Female riders must sometimes be reminded that in bestriding a wheel they cannot escape from the physical processes natural to their sex. Riding during menstruation is not advisable.

The delights of night riding may tempt to an unwise exposure to prejudicial thermal or atmospheric conditions. Riding in the full glare of a summer sun may also prove very dangerous. Painful conjunctivitis may result from a neglect to provide suitable eye-protectors from dust, wind, and flies.

Suitable clothing is of the greatest importance. It should be of wool, and adapted to the easy and unrestrained movements of the rider.

The machine should be suitably adapted to the sex, height, weight, and strength of the rider. The regulation of gear and adjustment of saddle are of the greatest importance to the physical welfare of the rider.

The writer believes with Hammond that properly regulated "cycling is an excellent exercise for maintaining health, retarding disease, strengthening the constitution, and at the same time is a mental recreation; while in many forms of disease when used cautiously and under medical supervision it will be found of inestimable advantage."

* PETIT. *Le Progrès Médical*, October 6, 1894.

Carefully recorded observations by medical men are, however, most desirable, so that the public welfare may be scientifically recorded and rationally regulated by the medical profession.

T. N. Kelymack.

HORSLEY (VICTOR). "On the differential diagnosis of cerebral tumours, with some remarks on treatment."—*The Clinical Journal*, February 13, 1895.

WHEN a patient presents the classical symptoms of cerebral tumour—optic neuritis, headache, and vomiting, epilepsy, stupor, and paralysis—the diagnosis is usually easy. Nevertheless, there are cases in which meningitis, abscess, and uræmic poisoning give rise to similar signs. As regards meningitis, careful inquiry into the history and causation will prevent a mistake being made. Between acute abscess and cerebral tumour there ought to be no confusion, but a chronic abscess may so closely resemble tumour that a diagnosis is sometimes impossible until an exploratory operation is undertaken. Often elevation of temperature is looked upon as a characteristic sign in sub-acute abscesses; but Wilks pointed out many years ago, that subnormal temperature is the characteristic feature to be looked for. As regards uræmia, the chemical and microscopical examination of the urine will be sufficient to indicate the presence of renal disease.

With regard to the important sign, double optic neuritis, the author mentions that, at his request, Mr. Marcus Gunn has measured the amount of swelling in different cases, and the results of his observations show, that the swelling of the discs was most marked on the side of the lesion in the majority of cases, but that there were exceptional cases in which it was more marked upon the opposite side.

The author then refers to the probability of optic neuritis occasionally occurring in simple anæmia, and relates the case of a young lady who suffered from headache of a very severe character, optic neuritis, and sickness. When first seen a certain degree of hemi-paresis was present. At a later period the hemi-paresis had for the most part cleared up, but there were other symptoms of a remarkable character "(twitchings of the trunk muscles, etc.) pointing to a cerebellar lesion," and also a very loud bruit localised strictly to a small area over the right cerebellar fossa. It was thought that a highly vascular tumour was situated at this spot, and the anæmic condition of the patient was looked upon as being probably secondary. The common carotid and (?) right vertebral were ligatured. The bruit, headache, optic neuritis, and cerebellar symptoms disappeared. The patient was also treated for the

marked anæmia. She has remained practically well since. Though a vascular growth may have been present, the author thinks now, that it is more probable that the cause of the symptoms was anæmia.

The above-mentioned symptoms are those of well marked cases, but the possibility of forming an early diagnosis depends on the character of the initial symptoms of a cerebral tumour. These are headache, epilepsy, and paralysis.

Headache in cerebral tumour may be diffused or localised. Diffused headache is, as a rule, an earlier symptom than the localised form. Examination for cranial tenderness, by pressure of the thumb over different parts of the skull *seriatim*, is of importance. A case is referred to, in which marked local tenderness was present exactly over the tumour. No complete reliance is ever to be placed on pain in the head alone.

Epilepsy.—This is the most important initial symptom. The character of the convulsion may be various : (1) It may be general, and so simulate idiopathic epilepsy ; (2) it may be generalised, but preceded by a localised aura ; (3) though generalised, it may also be commenced by localised muscular spasm ; (4) it may be a typical Jacksonian fit, becoming in some cases more generalised, and in some followed by a certain degree of paralysis ; (5) a cerebral tumour may evince itself by single spasms, not grouped as in a complete fit.

The author then refers to cases, illustrating the value of the character of the fit with reference to localisation of the lesion.

(a) *Frontal Lobe*.—Lesions of the frontal lobe appear to produce convulsions of the generalised type, and, above all, as Dr. Jackson has often pointed out, convulsions in which movements of a semi-purposive character are very prone to be exhibited.

The author then refers to a case illustrating another point of importance in the epilepsy of tumours of the frontal lobe. In the fit, the focus which commenced the disturbance was that for turning the head and eye to the opposite side. As the disease spreads from before backwards, naturally the first focus to become involved is that for the movement in question.

(b) *Parietal Lobe*.—The most common form of convulsion due to lesion of the parietal lobe is that known as Jacksonian epilepsy. Illustrative cases are referred to.

(c) *Parieto-occipital Region*.—The author thinks it is probable that in all cases of tumours of this region the convulsions will be found in the main to be generalised, and accompanied by ocular deviation and visual auræ.

(d) *Occipital Lobe*.—Tumours of the occipital lobe most commonly present generalised convulsions, hemianopsia from destruction of the cuneal region, and are not infrequently accompanied by so-called

hysterical manifestations. Hemianopsia is also a frequent and, in fact, usual accompaniment of tumours of the parieto-occipital region, where the lesion burrows deeply, and so affects the optic radiations.

(e) *Temporal Lobe, Outer Surface*.—Convulsions from lesions of this region, in cases recorded by T. Wilson and others, have been preceded by a sensory aura of an auditory type, also by amnesia. Where paresis follows, it is apt to be of a graduated type from pressure on the pyramidal fibres and areas of "motor" representation in the cortex.

(f) *Temporal Lobe, Inner Surface*.—In cases recorded by Jackson, Beever, and Anderson, the epileptic convulsion was signalled by the occurrence of hallucinations of smell and taste.

The author then points out that whatever may be the nature of the fits in the subsequent progress of the case, the initial attack is very often a generalised one. Also, in certain instances, the attacks are sometimes localised, sometimes generalised in the same case. The more deeply seated the growth, the more generalised is the convulsion. As regards size, the larger the tumour the more generalised is its effect.

The importance of paralysis is next considered, and the author points out that frequently in cerebral tumours a general muscular weakness is present, which has often been confounded with simple neurasthenia. Paralysis may arise by direct destruction or pressure upon the so-called motor frontal-parieto cortex, or by pressure transmitted indirectly to the same part from a lesion situated at a distance.

As regards sensation, Horsley believes that Hitzig's view, that the so-called "motor" region is really sensori-motor, is the correct one. In extremely limited lesions of the so-called "motor" region in man, there is a certain degree of tactile anæsthesia, and also, as pointed out by Bastian and Hitzig, a loss of muscular sense. In examining for cortical anæsthesia it is necessary to screen the patient's eyes, and ask him to point to the exact spot touched. Horsley regards this combination of slight loss of tactile sense with loss of muscular sense as characteristic of a parietal cortical lesion.

In cerebral lesions the deep reflexes are exaggerated on the side opposite to the lesion, whilst in cerebellar lesions, Russell has shown that they are exaggerated on the same side as the lesion.

In conclusion, Horsley points out that there is one great principle which seems to differentiate cerebral tumours from the great group of vascular lesions and their effect, namely, that during the weeks and months of the patient's illness, the symptoms in cerebral tumour are, if not masked by treatment, steadily progressive, and observation of their steady extension should always be looked upon as the most pathognomonic sign possible.

After six weeks' unsuccessful treatment with drugs, the author suggests that all cases of Jacksonian epilepsy should be explored (provided, of course, the sources of error above-mentioned have been excluded). Also, he regards the present practice of waiting till optic neuritis has developed as unjustifiable.

HIGGINS (F. A.) and OGDEN (J. B.). "Traumatic glycosuria."—*Boston Medical and Surgical Journal*, Feb. 28, 1895.

THE authors record the results of careful observation made in 212 cases of head injuries. The urine was carefully tested with Fehling's solution, and in most cases in which sugar was found, the fermentation test was used also for confirmation. (The cold method of testing with Fehling's solution was employed; 5—15 drops of urine were added to a little Fehling's solution (3 to 5cc.), and the specimen set aside for an hour or two; if no reduction of copper appeared, it was kept for 24 hours, and again examined.) The cases are divided into four groups. Sugar was found in 20 of the 212 cases.

Class I. includes simple scalp wounds and other minor head injuries. In 84 cases, glycosuria was met with in $5 = 5.95$ per cent.

Class II. includes scalp wounds, with bone exposed. In 43 cases, glycosuria was met with in $4 = 9.3$ per cent.

Class III. includes cases of concussion. In 40 cases, glycosuria occurred once = 2.5 per cent.

Class IV. includes fractures of the vault of the skull. In 24 cases, glycosuria occurred in $5 = 20.8$ per cent.

Class V. includes fractures of the bases of the skull. In 21 cases, glycosuria occurred in $5 = 23.8$ per cent.

The authors conclude—

(1) That, after injury, sugar may appear in the urine as early as six hours, and disappear within 24, the average time for its appearance, however, being from 8 to 12 hours. The average time for the disappearance of the same was from the fifth to the ninth day.

(2) That a small proportion of cases may exhibit a permanent glycosuria from the date of injury to the head.

(3) That acetone and diacetic acid are rarely, if ever, found in such cases, excepting where the condition becomes a permanent glycosuria, and even then probably only after a number of months or years.

(4) That of 20 cases in which sugar was found in the urine, 11 had received an injury to the right side of the head, 5 to the left side, 3 to the occiput, and in 2 there was no external evidence of violence. Of these 20 cases, 8 died.

(5) In 212 cases 16 were fatal, 50 per cent of these having glycosuria.

R. T. Williamson.

Surgery.

DUN (R. CRAIG). "The conditions interfering with the healing of wounds, with experiments on lesion and implantation infection."—*Edin. Med. Jour.*, March, 1895.

THE main condition upon which the healing of wounds by first intention depends is a state of unimpaired vitality of tissue. How great and important is the power of resistance possessed by the healthy tissues is proved by the experiments of Wegner, Grawitz, and many others, showing that injections of pus, decomposing fluids, and cultivations of staphylococcus aureus may be made into the healthy peritoneal cavity with negative results, but that if a condition of impaired vitality, a *locus minoris resistentiæ*, exists, owing to wounds, ascites, or other causes, peritonitis ensues.

The normal resistance of the tissues may be reduced by (1) impaired circulation, (2) impaired nervous supply, (3) presence of micro-organisms, the injury done by germs varying with the state of the soil, the number of the organisms, and their violence; (4) mechanical irritation, an important example of which is the mechanical irritation of peritoneal surfaces by contact with air, sponges, or the hands of the operator, bringing about necrosis of the superficial cells, and leading to the subsequent formation of adhesions; (5) chemical irritation. "Wound infection" is generally due to a combination of the three last injurious conditions. Kocher distinguishes two forms—"contact infection," such as arises from inoculation of organisms through the medium of instruments, hands, sponges, etc., and "implantation infection," i.e., arising from organisms placed in the wound, together with some foreign material (ligatures, etc.), acting as an agent, lowering tissue vitality. A striking example of this last form of infection occurred in Kocher's practice in 1888. Out of 31 major operations performed during a period of 7 weeks, only one case healed by first intention. After careful inquiry it was discovered that the catgut used for ligatures, which had been prepared with juniper oil, was the source of infection. After it was discarded, healing without suppuration was obtained in 62 consecutive major operations.

Dr. Dun prefers to use the term "lesion infection," to describe such cases as the one just mentioned, and he defines the term as "an infection of which the chief producing factor is lowered vitality of tissue, resulting from any form of external irritation." In Kocher's case, he thinks that the lowered vitality was induced by chemical irritation of the juniper oil added to the mechanical irritation of the ligatures, and

that the presence of organisms is to be accounted for in one of two ways—either that they were circulating in the blood stream and were retained at this *locus minoris resistentiæ*, or that they were introduced into the wound in the course of the operation and were only capable of pyogenic action on account of the lowered vitality induced by the irritating ligatures.

In order to test the relative powers of the more common conditions which lower tissue vitality and thus permit lesion infection, Dr. Dun undertook a series of experiments on rabbits, which consisted in the introduction into the subcutaneous tissue of—(1) Foreign bodies—knots of ordinary surgical silk; (2) chemical irritant—corrosive sublimate solution in various strengths; (3) micro-organisms—cultivations of *staphylococcus aureus* from acute abscess; *streptococcus pyogenes*—from phlegmonous erysipelas; and *bacillus coli communis*. Most careful precautions were employed to prevent any accidental infection from other sources. The tabulated results of the experiments show—(1) On the introduction of sterilised foreign bodies, the reaction (*i.e.*, hyperæmia and swelling) produced lasts longer when such bodies are present than when a simple incision is made, and that the larger the foreign body the greater is the reaction and the longer its duration. From this it is to be inferred that, as far as possible, torsion and “forcipressure” should be employed to arrest hæmorrhage in operation wounds—in preference to ligatures—and further, that ligature material should be absorbable, in order that it may soon cease to act as a foreign body.

(2) Foreign bodies plus chemical irritants—the knot of silk when soaked in corrosive sublimate solution, even as dilute as 1 in 1,000—produced an increased and prolonged reaction, and the reaction was found to increase, *pari passu*, with the strength of the sublimate solution. Wounded tissues should, therefore, be protected from the action of strong antiseptics, and only “indifferent solutions” allowed to touch them, such solutions being “normal saline,” or “salt soda,” which consists of $2\frac{1}{2}$ per cent of common salt and $7\frac{1}{2}$ per cent of sodium carbonate.

(3) Micro-organisms. The results show that (a) a large number of organisms produce abscess; (b) a lesser number cause swelling formation and hyperæmia; (c) minute inoculations give no reaction. It is probable, therefore, that such few organisms as may gain entrance to wounds through the air, or from other sources, are not to be dreaded—provided the tissues are maintained, as far as possible, in their normal state of vitality.

This point is illustrated by experiments which show (4) that a number of organisms, which are harmless if inoculated into healthy tissues, cause marked reaction when the tissues are in a state of lowered vitality. The infection thus produced is a “lesion infection.”

(5) A number of organisms, which even in tissues of lowered vitality produced no reaction, were enabled to do so by the addition of the devitalising action of a foreign body, constituting an "implantation infection."

The inflammatory reaction in the last series of experiments could be prevented, and the power of the micro-organisms neutralised, if the foreign body (knot of silk) were soaked in sublimate solution—the reaction produced being only equal to that which appeared when the knots and the sublimate were introduced without any organisms at all. "Since ligatures thus predispose to infection, the practical inference is that they should be impregnated with some mild antiseptic. It is not enough to have the ligature material aseptic or indifferent—it should be antibacterial."

J. W. Smith.

PRYOR. "Latent gonorrhœa in women."*—*Journal of Cutaneous and Genito-Urinary Diseases*, March, 1895.

THE writer believes that gonorrhœa occurs frequently in women as a latent condition, which can become acute and be followed by the most disastrous consequences, entirely without fresh infection, and possibly as a result of any process which for the time decreases the resistance of the infected tissues. For example, the bruising of tissues by confinements, operations, or violent coition, may lead to the rejuvenation of the gonococci, an auto-infection, with acute attacks of gonorrhœal urethritis, vulvo-vaginitis, endometritis and salpingitis, cases of which are quoted. The writer does not believe these latent conditions could start an infection of the male urethra, until thus relighted.

Vulvo-vaginitis in children and vulvitis, as well as gonorrhœal conjunctivitis, may be explained by the presence of this disease in a latent form in the mother.

As regards the ætiology of gonorrhœa, the author says every case of acute gonorrhœa will show the typical gonococcus, and also many cases of chronic infection; but if we fail to cultivate the gonococcus in acid media, and cannot find it by staining, we can safely say there is no gonorrhœa.

One hundred and ninety-seven prostitutes were examined as regards the urethra, vagina, and cervix uteri, the microscope alone being used, and no cultures made.

Cervix Uteri.—Gonococcus in 31·3 per cent. In these cases there was marked purulent discharge in two only, redness in one case, and in seventeen cases no symptoms whatever.

* Read before the section on Genito-Urinary Surgery, New York Academy of Medicine, January, 1895.

Vagina.—One hundred and eighty out of the 197 women presented a vaginal discharge; but the gonococcus was found in seven cases only, though many other forms of bacterial life were present.

Urethra.—One hundred and twelve of the women showed gonococci. In twenty-one the disease was evident on ocular inspection, but in ninety-one cases the gonococcus was found with no pus discharge. In seventy cases a follicular urethritis with discharge existed, but gonococci were not present.

The author found it was not sufficient merely to take for microscopic examination the discharge from the cervix, but scrapings with Volkmann's spoon. He believes that in an overwhelming percentage of cases purulent urethritis and endocervicitis are due to gonorrhœa. The gonococcus seeks the racemose gland for its habitat. Therefore we find gonorrhœa as a latent disease in women in the compound racemose glands of the cervix, the vulvo-vaginal glands, and of the urethra. Dormant gonorrhœa may produce no changes which will allow of its recognition. In such a state it may become acutely virulent at any moment, so as to be communicated to other tissues of the woman, or to the male, or her child.

The author believes the prevalence of gonorrhœa is not due so much to neglected gleet in the male as to the uncured latent form in woman.

LYDSTON. "Leucoplasia and its relation to syphilis."—*Journal of Cutaneous and Genito-Urinary Diseases*, March, 1895.

LESIONS of the mucous membranes in early syphilis are so characteristic that their pathological characters and their treatment are understood and recognised by all. Late in the history of syphilitics, however, lesions of the mucous membranes are met with which are the most typically sequelar, inasmuch as they are the result, not only of syphilis *per se*, but of numerous other factors. These post-syphilitic lesions consist of hyperplastic infiltration of the mucous and submucous tissues, and have been described by different authorities as leucoplakia and leucoplasia. Perrin believes these post-syphilitic white, hyperplastic plaques have for their elementary character functional and organic changes of the epithelium. He believes they may occur as a consequence both of syphilis and of the anti-syphilitic treatment. He also points out that these occur specially in syphilitics and non-syphilitic patients addicted to tobacco, often in gouty or rheumatic subjects.

The mistake is often made of believing these lesions should be as tractable under anti-syphilitic treatment as the other lesions of the mucous membranes occurring in that disease.

"As a matter of fact, these lesions must be regarded essentially as non-syphilitic neoplasms occurring upon a syphilitic foundation." The greatest importance of this condition lies in the decided tendency to assume a malignant character.

Besides the white plaques of hyperplastic epithelium, the same local perversion of nutrition may lead to the development of fissures, with margins of hyperplastic epithelium, or the edges of which may have become transformed, presenting a smooth, glazed, and dry appearance. In other cases distinct ridges show themselves, particularly along the edge of the tongue, notably in patients who have been overtreated with mercury. Sometimes there may be elevated plaques, the epithelium presenting a smooth, reddened, glazed appearance; in these cases there is extreme irritability of the epithelium and often considerable pain. A more formidable variety of post-syphilitic neoplasm, which the author believes to be essentially "pre-cancerous," occurs as distinct circumscribed nodules, which have a tendency to develop along the margins of the tongue, but are often seen near the raphe, and in some instances are limited to the base of the tongue on one side or other. They are apt to be mistaken for gummata, and Dr. Lydston thinks they may be gummata in which the "gummy deposit" is replaced by new connective tissue. They are to be regarded as extremely dangerous, as it is this form of post-syphilitic mucous lesion which is most likely to undergo malignant transformation.

As regards the treatment of leucoplasia, the author says discrimination is necessary to estimate as accurately as possible the relation of other factors than syphilis to the pathological condition under consideration. As a rule, in these cases the proper course of anti-syphilitic should be tonic rather than radical. Small doses of perchloride of mercury may be given with tincture of cinchona. Sometimes even a moderate amount of mercury may aggravate the lesions; then tonics without mercurials are indicated.

Tobacco and alcohol should be avoided as a rule. Caustics, unless applied to the extent of complete, thorough destruction, will only serve as irritants and make matters worse. In cases showing a tendency to stubbornness or recurrence the author advises free excision with the knife or scissors, followed by the application of the actual cautery, looking upon such cases as essentially malignant, and in which half-hearted measures are worse than useless. He thinks it is a question whether these cases are not more unfavourable than ordinary malignant disease of the mucous membranes of the mouth, on account of the syphilitic dyscrasia or the post-syphilitic anæmia and debility of over-dosed patients.

Francis J. H. Coultis.

Midwifery and Diseases of Women.

DÜHRSEN. "Treatment of placenta prævia by the intra-uterine dilator."—*Deutsche med. Wochenschrift*, No. 19, 1894.

THE author states that whilst Braxton Hicks's combined version has given satisfactory results in the treatment of placenta prævia as far as the mother is concerned, it has not proved so successful in the case of the child, for out of 26 cases of placenta prævia which he has already published, 18 were treated by combined version, with the result that only 3 children were born alive. These figures, however, include children already dead when version was performed, or born prematurely. As even the most favourable statistics showed an infantile mortality of 60 per cent, Dührssen decided to apply indiarubber dilators. The use of these in 6 cases of placenta prævia resulted in the birth of 5 living children; the sixth was born before term and did not survive, it might have been saved had there been sufficient dilatation to allow of the performance of version and extraction; all the mothers recovered. The hæmorrhage was rapidly arrested in every case, and in only one was there any subsequent febrile disturbance.

Dührssen's method of using the dilator differs from those of other authors, in that the bag is introduced after rupture of the membranes, and a moderate continuous traction is made upon it. This is necessary in order that the bag may act as a presenting foetal part, and press the separated placenta against the uterine wall; the proof of this lies in the fact that hæmorrhage continued after the introduction of the bag until traction was made. In cases where hæmorrhage ceases after rupture of the membranes, Dührssen considers his method useless. Traction is made from the foot of the bed, the bag coming away in three hours in 50 per cent of cases, and the child being born immediately afterwards.

The chief difficulty of the method lies in the rupturing of the membranes. When it is necessary to perforate the placenta, dressing or bullet forceps are used. The bag is introduced in the grasp of long catch-dressing forceps, the operation being easy if the cervix will admit a finger. Where possible, it is a good plan to keep a finger in the cervix after the introduction of the bag, till the latter has been filled. An assistant does this by means of an ordinary funnel and tube, no more than half a litre of water being used, this amount giving the dilator a diameter of 10·5cm., and a circumference of 31cm. A larger amount of water produced over-distension of the uterus and weakened its contractions. Traction is then made from the foot of the bed, in a line

directly downwards from the pelvis, in order that there shall not be any bearing against the pubic symphysis by the dilator. As soon as the violence of the pain or vaginal examination indicates that the bag is in the vagina, it is removed, and according as hæmorrhage occurs or not, one turns and extracts, or waits. It is, of course, necessary to make certain of the presentation as soon as the bag is removed. Air is never employed to fill the dilator, lest rupture of it should result in gaseous embolism.

PINARD. "First application of the 'mensurateur-levier-préhenseur' of Farabœuf"—*Revue de Thérapeutique medico-chirurgicale*, Nov. 15, 1894.

PINARD related to the Academy of Medicine of Paris, at its sitting on November 6, how on the previous day he had made the first application of Farabœuf's instrument at the Clinique Baudelocque. The case was one of twins. The first child was born normally; the second had a larger head, and was detained at the brim for six hours. Naegle's obliquity was present. The instrument, previously sterilised, was easily introduced, and seven minutes later the child cried.

CHARLES: Liège. "The 'mensurateur-levier-préhenseur' of Farabœuf."—*Journal d'Accouchements*, October, 1894.

THE author has made a comparative study, from a theoretical point of view, on the employment of forceps and of Farabœuf's instrument in flattened pelves. The new instrument recalls those which have been proposed since the beginning of the century for the application of antero-posterior forceps. Charles considers that it is not easy to carry the anterior "spoon" behind the pubes; to do so the head must be freed, and raised if it bears much against the brim. This manoeuvre is not always possible, nor yet without danger when the liquor amnii has quite drained away, and the uterus firmly contracted. A further objection is that the fingers cannot guide the "spoon" to the front; it therefore has to travel alone, and during its journey it may come across the cord or a limb, either of which may be included in the grasp of the instrument on the head. The thickness of the "spoons," too, added to the cephalic diameter, may be sufficient in many a case to prevent the descent of the head. Charles is inclined to think that the lever could replace the forceps with benefit in many cases. As to the use of Farabœuf's instrument as an intra-uterine cephalometer, he does not appear to consider it of any great practical value. It gives no information as to the compressibility of the cranium.

REVERDIN (A.). "Bilateral dermoid ovarian cysts in an unmarried girl of 20 years."—*Nouvel. Archiv. d'Obstet. et de Gynéc.*, February, 1895.

THE patient, of healthy appearance, had suffered for 18 months from attacks of pain in the lower abdomen, which completely incapacitated her, and were accompanied by considerable febrile disturbance. A swelling was found occupying the right iliac region: the uterus was pushed forwards behind the symphysis, and slightly to the left: the pouch of Douglas was filled by a swelling which transmitted movements practised on the abdominal tumour. The diagnosis was ovarian cyst, with torsion of the pedicle. At the operation a fluctuating tumour was exposed, with a pedicle twisted three times upon itself. The cyst wall was fairly thick, but no more resisting than tissue paper, as it was œdematous, and the peritoneum covering it was inflamed. Rupture soon occurred in the course of dividing numerous adhesions: the discharged contents were of a brownish colour and distinctly dermoid in character. The vessels in the pedicle were thrombosed. The right ovary was also removed, as it was enlarged, and had several cysts projecting from its surface. The patient recovered normally. The larger tumour was lined by skin, and contained in the mélange of sebaceous matter and hair a bone representing a superior maxilla, and carrying four teeth. One of the cysts in the right ovary contained a yellowish oily matter and a felted mass of blonde hair. The other cysts were of follicular origin.

HOFMEIER. "Extra-uterine pregnancy."—*Verhandlungen der Physikalisch-Medicinischen Gesellschaft, Würzburg*, 1894.

HOFMEIER publishes some considerations based on fourteen cases. In diagnosis he points out the value of a sign indicated by Veit, viz., the pulsation on one side of the tumour is often observed to be greater than that on the opposite side. It is of especial value in indicating whether the foetus be alive or not. In three cases, relying on this sign, Hofmeier correctly diagnosed extra-uterine pregnancy: in two others the sign was present at first, but disappeared with the death of the foetus. The character of the intra-uterine decidua is of value in the early stage, but unfortunately at this period the connection of the sac with the uterus is so close that any attempt at obtaining a piece of decidua for examination is attended by risks of rupture and hæmorrhage, as Hofmeier observed in one case. Later, when these dangers are less, the mucosa has lost its decidual character.

In treatment there is little to be feared from hæmorrhage if the ovarian artery and the ovarian branch of the uterine are secured. The difficulty is to know whether the gestation is already interrupted or

whether it is continuing: the attacks of pain mean nothing; one must be guided by disappearance of pulsation previously observed, arrest of growth of the tumour, which becomes hard and irregular, and discrepancy between the duration of the pregnancy and the size of the tumour.

Out of fourteen cases, Hofmeier operated nine times, with eight recoveries and one death on the thirteenth day. Of the five not operated on, two died, one of hæmorrhage, the other of suppuration in the second half of the pregnancy; in two, retrograde changes occurred spontaneously, and a lithopædion was formed in the fifth.

As regards etiology, Hofmeier confirms Martin's statement that alteration of the mucous membrane is *not* the cause of ectopic gestation, but rather that a normal state of the mucosa is necessary for the implantation of the ovum. He ascertained that the mucosa around the ovum was quite normal, even the ciliated epithelium being intact. He also opposes Fritsch's view that adhesions may be a cause, and states that they are formed *after* the ectopic gestation. He also contests the view that a long period of sterility precedes the abnormal condition. His own theory is that the cause consists in the meeting in a normal tubal cavity of an ovum and a spermatozoon, and that the resulting impregnated ovum is prevented from passing through the narrow part of the tube either by its rapid increase in size or by alteration in its external surface, such as the formation of villosités.

Arthur Wallace.

Pharmacology and Therapeutics.

LANDERER. "Die Behandlung der Tuberculose mit Zimmtsäure."—*Therap. Monats.*, February, 1894.

MOSCHOWITZ. "The treatment of pulmonary tuberculosis with cinnamic acid."—*Medical Record*, March 2, 1895.

IN 1891 Professor Landerer published a pamphlet entitled "Anweisung zur Behandlung der Tuberculose mit Zimmtsäure," in which he described a method of treating pulmonary tuberculosis with intravenous injections of cinnamic acid.

He has since recorded the result of this treatment, and in a paper in the *Therapeutische Monatshefte* for February, 1894, states

them as follows : He has treated 78 consecutive and unselected cases of lung tuberculosis, with 18 deaths (23 per cent). Out of 84 cases of tubercular disease of the internal organs he has lost 21 per cent. He divides cases of pulmonary tuberculosis into four groups :—

(1) Cases of chronic tuberculosis without cavity and with moderate evening elevation of temperature, were, without exception, benefited by this treatment, and were cured by a sufficiently long course.

(2) Cases with cavity, but without important temperature rise, showed for the most part lasting improvement.

(3) Cases with large cavities and high fever improved for a time, but not permanently.

(4) Cases of so-called "galloping consumption" showed unfavourable results.

Landerer gave minute directions as to the method in which the cinnamic acid was to be used, which are reproduced by Moschowitz in the *Medical Record*. Only the cinnamic acid prepared from storax is to be used ; this is made into an emulsion with oil of almonds and yolk of egg, rendered alkaline, and injected into the cephalic vein, the amount of the emulsion injected being from five to twelve drops. The emulsion contains about 5 per cent of cinnamic acid.

Landerer experimented on rabbits infected by injections of fresh cultures of tubercle bacilli, and his results have been corroborated by Richter (*Virchow's Archiv*, Vol. CXXXIII.). Landerer found that the infected rabbits left untreated as controls died, some in three or four weeks. Those which were treated with the cinnamic acid showed at first loss of weight and unmistakeable signs of the disease, but later on they recovered, and when killed showed the characteristic changes in the lungs.

As regards the theory of the action of cinnamic acid, Landerer refers it to its marked chemotatic action, that is to say, when injected into the circulation it produces leucocytosis. The polynuclear leucocytes are increased in number, and to a less extent the eosinophile cells also.

Leucocytosis begins an hour and a half to two hours after injection, and reaches its maximum in 8 hours, with two and a half times the ordinary number of leucocytes. In the lungs of tuberculous rabbits there is first an accumulation of leucocytes in the alveolar septa, then a dilatation of the capillaries and small veins, and here and there exudation and epithelial desquamation into the alveoli. The process goes on to the formation of young connective tissue, and ultimately cicatrization of the tubercular foci.

Moschowitz has not obtained such good results as those recorded by Landerer, but thinks them sufficiently encouraging to justify him in calling more general attention to this form of treatment. He gives minute

instructions in the technique of the method, and the preparation of the emulsion of cinnamic acid. He then goes on to discuss the theory of this treatment, quoting the results of Richter's experiments on rabbits.

Of eleven cases treated by Moschowitz, two died, but in one the prognosis was absolutely bad from the start, and in the other, material improvement followed the treatment, but the case terminated fatally through an intercurrent catarrhal pneumonia. Six of the cases showed marked improvement, with gain in weight, decrease in number of tubercle bacilli, and disappearance of some of the physical signs; the remaining three cases do not admit of any decided opinion.

Mader (*Wiener klin. Wochenschrift*, 1894, No. 50) states that not only have no curative results followed his use of the treatment by intravenous injections of cinnamic acid, but he has also noticed untoward effects, such as local swelling or inflammation if some of the solution escaped alongside the vein. Often marked feeling of oppression was observed after the injection, as well as severe pains in the sacrum, head, or chest.

SASSE (J.), "Turpentine as a hæmostatic."—*Therapeutische Monats.*, February, 1895.

BLEEDING after tooth extraction is not often a serious matter; still at times it is extremely difficult to stop. Dr. Sasse records a case in which a little cotton wool soaked in oil of turpentine, pressed into the bleeding tooth cavity, checked hæmorrhage when other means had failed, and states that he has found it of benefit in other cases of the same kind. His experience is corroborated by two or three other Dutch observers, whom he quotes. He also describes a case of scorbutus, with hæmaturia and bleeding from the gums. Besides painting the bleeding surfaces with turpentine, he gave a little of the oil internally, with the result that the hæmorrhage was stayed and blood ceased to appear in the urine. It should be added that lemon juice and fresh vegetables were also given.

Two cases of scorbutus previously treated, without turpentine, had died. In a third case, in which he found oil of turpentine check hæmorrhage, the bladder was the source of the bleeding, the urine containing blood, bladder epithelium, and mucus. After salol, boric acid, and *uvæ ursæ* had been tried, a teaspoonful of 0.5 per cent emulsion of turpentine was given every hour, with success. Turpentine has been long used in purpura, but Dr. Sasse has been unable to find any cases in which scorbutus has been treated by this drug. It has, of course, been used in several forms of hæmaturia.

D. J. Leech.

FOSTER. "Cases of diphtheria treated with and without the antitoxin."—*Medical News*, February 2, 1895.

DR. FOSTER gives a very useful summary of the results of the antitoxin treatment of diphtheria obtained from the cases recorded by German, French, British, and American observers. He gives three tables: one of cases of diphtheria treated with antitoxin, another of cases treated without antitoxin, and a third of cases treated with the antitoxin on the first, second, third, and other days.

The conclusions from a study of these tables are stated by Dr. Foster thus:—

(1) That of 2,740 cases of diphtheria—selected and unselected, and which included those that required tracheotomy and intubation—treated with the antitoxin, only 509 died, or a mortality of 18·54 per cent.

(2) That of 4,445 cases, which also included those that required tracheotomy and intubation, not treated with the antitoxin, 2,017 died, or a mortality of 45·36 per cent.

(3) That all the cases recovered in which the antitoxin treatment was begun on the first day of the disease; that 2·83 per cent of the cases died in which it was begun on the second day; that 9·99 per cent of the cases died in which it was begun on the third day; that 20 per cent of the cases died in which it was begun on the fourth day; that 33·33 per cent of the cases died in which it was begun on the fifth day; and that 41·38 per cent of the cases died in which it was begun after the fifth day.

Dr. Foster points out that the serum has a destructive effect on red blood corpuscles, and states that the following secondary effects have been noticed in a few of the cases treated with it: erythema multiforme; an urticarial eruption associated with malaise, glandular enlargement, and paræsthesia; pains in the knee-joints, ankle-joints, and elbow-joints, and swollen and reddened ankle-joints; a purpuric condition. The secondary effects, however, did not last longer than several weeks.

Francis J. H. Coutts.

CRIPPS (R. A.). "Standardised preparations of belladonna."—*Pharmaceutical Journal*, Vol. LIV., p. 793.

THE first portion of the paper consists of a résumé of the work already done on this subject, with criticisms. The author advocates the use of a liquid extract containing ·75 per cent total alkaloid, obtained from the root by re-percolation with strong alcohol. From this preparation all the others can be made, viz., emplastrum (·5 per cent), extractum alcoholicum (·3 per cent), linimentum (·25 per cent), tinctura (·025 per cent), unguentum (·3 per cent). Pulvis extracti belladonnæ compositus is the name given to a dry powdered extract containing 1 per cent total

alkaloid ; it is intended to eventually replace the official green extract. Working formulæ for the foregoing, and also for the non-official glycerinum ('5 per cent), are given.

UMNEY (J. C.). "Empleurum serrulatum."—*Pharmaceutical Journal*, Vol. LIV., p. 796.

AN account is given of a proximate analysis of this drug, which is a well-known adulterant of the commercial varieties of barosma. An examination of one of these (barosma betulina) has also been carried out for comparison. The mucilages obtained from these appear to be very closely allied. The essential oils and alcoholic extracts, however, exhibit considerable differences. Barosma oil yields about 33 per cent of a solid phenolic body (barosma camphor). On the other hand, empleurum oil appears to be mainly a ketone (methyl-nonyl ketone?). The latter oil on being freshly distilled has a fishy odour, which is evanescent. The infusion obtained from empleurum is also characterised by this offensive odour. The alcoholic extract of barosma is almost entirely soluble in water, that of empleurum only partially so, the insoluble portion being a soft resin. The aqueous solution of the alcoholic extract, in both cases, gives glucosidal reactions. The author points out that until a therapeutic examination has been made, the use of empleurum as a substitute for buchu is to be avoided.

J. H. Roseason.

OSWALD (L. R.). "Hæmatoporphyrinuria, following the administration of sulphonal."—*Glasgow Medical Journal*, January, 1895.

THE case reported is that of a female patient who was admitted to the Glasgow Royal Asylum, suffering from acute mania, in August, 1893. She had several relapses, and paraldehyde, chloral, and bromide were used at different times as hypnotics. On April 16th, 1894, she had sulphonal for the first time, a dose of 15 grs. being given twice daily; this was continued in varying doses for nearly three months, then rarely for three weeks, and again regularly, in doses of 10 grs., twice daily, until the onset of the fatal illness on August 23rd, 1894. In all, 2,200 grs. of sulphonal were taken, of which 1,800 grs. were administered in the months of April, May, and June.

The effect of the sulphonal was to procure sleep, lessen the excitement, and calm the patient; there was no evident injurious effect.

On August 24th she vomited and complained of abdominal pain; the sickness continued for seven days; paralytic symptoms appeared in the limbs, urine and fæces were passed involuntarily; temperature 99·6 F., respirations 36, pulse 84; she gradually lost strength and died September 2nd.

The number of blood corpuscles was found to be reduced to 3,250,000.

The urine was reduced to from 14 to 23 ounces; it was always acid, and contained a trace of albumen; specific gravity varied from 1,021 to 1,036. The colour was usually a very deep claret, but varied; it was sometimes clear and sometimes muddy. The sediment contained abundant blood discs, much altered in shape, of shrivelled appearance and irregular outline; no tube casts but much granular debris. The colour of the urine was found on spectroscopic examination to be due to hæmatoporphyrin, or a body closely allied to it; there was no blood as such in the urine, and no bile pigment.

The post-mortem examination showed much congestion of the liver and kidneys, and microscopic examination demonstrated structural changes in these organs. No other lesions of special note were found. The author points out that about forty cases have been reported in which hæmatoporphyrinuria followed the administration of sulphonal, and over one-half of them terminated fatally. They had mostly clinical features in common with the above case, and the amount of sulphonal previously taken varied in the different cases from 400 to 8,000 gra. Until serious symptoms (vomiting, altered urine, etc.) appeared the drug seemed to be suiting very well; in several of the fatal cases motor paralysis was the most prominent symptom before death.

The author suggests that sulphonal exercises a destructive power over the blood, setting free hæmatoporphyrin and other allied substances, which act as hypnotics; and that an explanation of the fatal issue in many of these cases may perhaps be found in a cumulative action of the sulphonal, affecting the adrenals, leading to a rapid destruction of blood, and to such an accumulation of the decomposition products of hæmoglobin as to give rise to serious effects on the nervous system, and to death.

As a temporary hypnotic and sedative it is of great service, but its administration requires to be carefully watched, as with little warning symptoms of great severity may arise.

R. B. Wild.

"Monochlorphenol in tubercular laryngitis."—*Amer. Medico-Surg. Bull.*, January 16, 1895.

DR. THOMPSON reports three cases of laryngeal tuberculosis in which the local application of a 5 per cent solution of monochlorphenol gave markedly beneficial results. He considers that this drug had a marked anæsthetic effect, diminishing pain and cough and allowing the patients to swallow their food much more freely. Monochlorphenol is carbolic acid, with one atom of hydrogen replaced by chlorine. It is a colourless, volatile, oily liquid, with a rather offensive odour. It is miscible with the light petroleum oils and freely with glycerine.

"Treatment of stomach ulcer by bismuth in large doses."—*Centralbl. für Therapie*, 1894, No. 7.

ROSENHEIM says no remedy is better than bismuth in simple ulcer of the stomach. Patients who suffer from this ailment ought to take $2\frac{1}{2}$ drachms of subnitrate of bismuth, suspended in 6 ounces of lukewarm water, in the morning, fasting and in bed. This treatment not only calms the pain, but excites the secretion of mucus, while restraining the secretion of hydrochloric acid. The patient, after taking the bismuth, ought to remain lying on his back for an hour, the pelvis being raised by pillows, for the seat of ulceration is usually on the posterior wall of the stomach in the pyloric region. Milk diet is always indicated, and all irritant food, and especially alcohol, should be avoided. Small quantities of food taken frequently are preferable to copious meals. At night the patient should have wet compresses on the abdomen. Bismuth should be taken for twelve successive days, and if after an interval the pain should return, it may be again administered.—*Bull. de Thérap.*, January, 1895.

"Treatment of painful dyspepsia."—*The Therapeutic Gazette*, February 15, 1895.

INDIGESTION, with sensation of distension, frequently associated with pain in the præcordium when occurring in neurotic subjects, has received the name of "nervous indigestion." The following formula will prove valuable in a large proportion of such cases :—

Chloral ..	 $\frac{1}{2}$ -drachm or 1 drachm.
Sodium hyposulphite	1 drachm or 2 drachms.
Peppermint water	to 3 ounces.

Mix.

A teaspoonful after meals.

The chloral acts as an antiseptic and nervous sedative, as does also the hyposulphite of sodium; and the peppermint water, if freshly prepared, is antiseptic and also slightly anæsthetic and stimulant.

"Ergot of rye in night sweats of phthisis."—*Deutsche med. Wochenschrift*, No. 26, 1894.

GOLDENBACH, recognising the marked effect of ergot on the vasomotor nerves, has used this drug in the treatment of the night sweats of phthisis. In most cases it has given remarkably good results. Usually he has ordered his patients to take, in the evening before going to bed, five grains of ergot in powder. He has also had recourse to subcutaneous injection, employing the following formula :—

Extract of ergot (Germ. pharm.)	3 parts.
Dilute spirit (Germ. pharm.)	} of each 5 „
Glycerine	
Distilled water	

"Ferripyrrin."—*Therap. Monatshefte*, February, 1895.

A COMBINATION of chloride of iron and antipyrin has been brought forward by Dr. Witkowaki, of Frankfort, as a hæmostatic and astringent, and is sold under the trade name of ferripyrrin. Its composition, according to Witkowaki, is—Fe, Cl, 3 (C₁₁, H₁₁, N₂, O). It contains 64 per cent of antipyrine, 12 per cent of iron, and 24 per cent of chlorine. Ferripyrrin is an orange-red powder, easily

soluble in cold water (1 in 5), the solution being of a dark-red colour. Hot water dissolves it less easily than cold. Experiments made in the Throat Department of Professor Juraas, in Heidelberg, seem to show that it is a valuable styptic and astringent, having the advantage over perchloride of iron in not acting as a caustic. When applied to the mucous membrane of the nose, it acts as a powerful astringent and produces a slight anæsthetic effect. It is used in the form of an 18 to 20 per cent solution, pledgets of cotton wool soaked in this being applied to the bleeding parts. For gonorrhœa injections of $1\frac{1}{2}$ per cent solution may be used. In hæmatemesis doses of 7 to 8 grains should be given.

In the *Lancet* of March 2, 1895, a correspondent from Cannes writes that he has used ferripyrin with success.

"Action of carbonate of lime."—*Berl. klin. Wochenschrift*, 1894, No. 23.

LEHMANN has shown that daily doses of 75 grains of carbonate of lime lead to a diminished excretion of phosphoric acid and soda in the urine. The amount of alkali in the body is increased; the quantity of urine passed in 24 hours is likewise increased by half a pint daily whilst the lime salt is taken. Lehmann, on this account, thinks lime salts may have a marked therapeutic effect in the uric acid diathesis.—*Centrallbl. für Innere Medicin*, March 9, 1895.

Diseases of the Eye.

BOURGOIS (A.). "Glasses for use after cataract extraction."—*Recueil d'Ophthalmologie*, No. 7, 1894.

AFTER extraction of cataract, when the place of the extracted lens has to be supplied by spectacles for clear vision, we have a choice of various forms. If both eyes have been operated on it is usual to prescribe two pairs of glasses, one for distance, of about 10 diopters convex, and for reading, a pair of about 16 diopters convex. When, however, only one eye has been operated on, it is customary to prescribe for the untouched eye either a plain transparent eye-piece, or one of frosted glass, according to whether the eye can be used for seeing or not; another plan, when only one eye has had the cataract removed, is to prescribe a single pair of glasses which are reversible, with a straight bridge, so that for distant vision the weaker glass may be used, and for reading, etc., the glass of shorter focus. A third method is merely to prescribe glasses for distance, and to furnish the patient with a magnifying hand glass of about 6 diopters with which he will be able to read without taking off his distant glasses. Of course, the objection to this method is that the patient has continually to carry about a hand magnifier with him, in case he may be suddenly called upon to use his eyes at reading distance. To obviate the trouble of constantly carrying two pairs of glasses about, Dr.

Bourgeois proposes to employ a single pair of convex glasses of reading strength (+16 D), having hinged at the upper part of the eye-piece a concave lens of 5 to 6 diopters which can be brought down in front of the reading lens when the patient wants to see clearly at a distance. For reading he merely tilts up the concave lens at right angles to the perpendicular, and returns to his reading glasses. To the natural objection that a compound pair of glasses like this would weigh heavier than ordinary ones, he replies by giving actual weights of cataract spectacles, and we find that while each pair of ordinary glasses weigh 26 grammes on an average, Dr. Bourgeois' compound arrangement weighs only about 35 grammes. A further advantage may be claimed, that the hinged concave glass may be either tinted blue or London smoke, if required, when used for distant vision. Certainly the arrangement now proposed, though one which would take some little time to get accustomed to, presents very considerable advantages over the Franklinic form of spectacle or even over lenses ground to a double focus.

MATHIEU (F.). "Spontaneous pseudo hæmorrhage of the conjunctiva."
—*Recueil d'Ophthal.*, No. 12, 1894.

DR. F. MATHIEU publishes an interesting clinical note worth recording here, which does much to explain the causation of those rare cases of so-called spontaneous hæmorrhage from the conjunctiva. A woman, aged 50, came under his care complaining of bleeding from the eye, saying that she often awoke in the morning with her face and the pillow spotted with blood. On superficial examination the eyes appeared healthy, and the bulbar conjunctiva intact, but on everting the upper lid in the marginal sulcus of the tarsal cartilage, somewhat to the outer side, a little mulberry shaped sessile tumour was discovered $2\frac{1}{2}$ millimetres long and one millimetre wide; the slightest touch with a blunt probe producing abundant hæmorrhage. Pressure not being sufficient to control the bleeding the little tumour was destroyed by galvano cautery. The diagnosis was that of conjunctival papilloma which had become angiomatous. This case gives support to Galezowski's recommendation always to evert the upper lid and explore the fornix in all cases of weeping tears of blood, or so-called vicarious menstruation.

MALGAT. "Injection of strychnia in spontaneous mydriasis."—*Recueil d'Ophthalmol.*, No. 12, 1895.

DR. MALGAT reports the case of a woman, aged 50, of a nervous temperament, but not hysterical, who was one day seized with a sudden fit of violent passion, followed by severe headache. Her anger having cooled down, she retired to bed in the hope that sleep would relieve her

of her headache, but instead of subsiding, the pains in the head increased, driving away all chance of rest. When the day broke, the patient was disagreeably surprised by finding that her sight had become misty. Closing first one eye and then the other, she ascertained that the vision of the right eye was good, but that of the left eye was very bad. Her headache lasted four days, the sight of the left eye not improving in the least. When seen ten days after the attack the pain in the head had left her. She suffered from vertigo when both eyes were open, and when she closed the right eye objects looked much smaller (micropsia) with the left eye. On examination the left pupil was found to be widely dilated, the media clear, and the fundus absolutely normal (of course, it was fully ascertained that no mydriatic had been used). Cases of essential mydriasis are common enough, but they generally are most refractory to treatment; hence the interest of this case, which was permanently cured by nine subcutaneous injections each containing one milligramme of sulphate of strychnia. The injections were made twice a-week, and at the end of the fourth week the pupil had become restored to its normal size and activity, normal acuity of vision being regained. The rapidity of the cure is indeed remarkable if it be not simply a fortuitous coincidence, or if reliance can be placed on there being no hysterical element in the case.

LEPLAT (M.). "A fatal case of meningitis after probing and irrigation of the lacrymal canal."—*Recueil d'Ophthalmologie*, No. 11, 1894.

THE case was that of a lady who consulted M. Leplat on account of cataract in the left eye; the other had been operated on some years before. Chronic dacryocystitis being observed, it was very properly proposed to cure this before proceeding to extract the cataract. The patient, being a very timid person, energetically resisted the suggestion that the lacrymal duct should be opened and probes passed. Finally, after using astringent lotions to no purpose for several months, the lower canaliculus was slit up and the duct irrigated with a three per cent lotion of acetate of alum.

As there was an obstruction of the nasal duct lower down, the fluid never passed satisfactorily into the nose. After some time, the patient being seen only at long and irregular intervals and obtaining no amelioration of her condition, it was proposed to her to permit her nasal duct to be properly probed. This she only allowed to be done after a month's hesitation, as an alternative to obliteration of the lacrymal sac.

Chloroform was dispensed with, owing to some valvular affection, on the advice of her medical attendant. Accordingly, on the 5th of

June, her objections being overcome, M. Leplat succeeded in inserting a No. 2 Bowman's probe two-thirds of the way down the lacrymal duct. As this catheterisation was not followed by any bleeding, a little water was first injected, and then followed by a solution of alum acetate. No fluid appeared at the nostril. The next day there was more purulent discharge from the sac, but no swelling. On a renewed attempt the probe could not be pushed further than on the previous day. After leaving the probe in for a quarter of an hour another injection of alum lotion was attempted. During its progress the patient made a brisk backward movement of the head, forcing the nozzle of the syringe out of the canal, expectorating violently, and complaining of an astringent taste in her mouth. The syringe was found to be two-thirds empty. On returning home after this operation she was seized with vomiting, and the side of her face and head swelled up, evidently from an attack of acute cellulitis. She was treated for erysipelas, and continued to improve for four days, when she was attacked with fits of vomiting, and in the evening of that day coma set in for a short while. The next day she somewhat improved, but had rigors, violent pain in the head, and vomiting. In the afternoon she again lost consciousness, became deeply comatose by nine o'clock, and died next morning. This unfortunate case of meningitis following a simple dilatation and irrigation of the lacrymal canal, which upsets all one's preconceived notions as to the safety of such a proceeding, is happily an extremely rare accident, and goes on all-fours with the case related by Jaeger, where a subcutaneous injection of morphia in the temple was the starting-point of an attack of orbital cellulitis. Dr. Leplat discusses various modes in which the fatal result might have been occasioned, but the most likely explanation is that the small probe injuring the mucous membrane of the lacrymal canal produced a solution of continuity through which the injected fluid, carrying in its course myriads of infectious microbes, reached the venous plexus connected with the internal angular vein, and from there readily deposited the infection in the cavernous sinus, where it soon produced the fatal purulent meningitis. Bearing in view the anatomy of the parts, it is a matter for surprise that serious consequences do not more frequently follow the often rude manipulations to which the lacrymal tract is subjected by some surgeons.

CHIBRET. "The relative value of mercury and potassium iodide in the treatment of ocular syphilitic affections."—*France Médicale*, No. 34, 1894.

CHIBRET takes as his text that, for twenty-nine years he has had doubts as to the value of iodide of potassium as a specific in syphilis, and that

fifteen years of ophthalmic practice have confirmed him in this opinion. His views on the subject may be summarised as follows:—In ocular syphilitic affections mercury alone is almost always of benefit; iodide of potassium given alone is without effect. In genuine syphilis mercury alone almost always influences the course of the disease, and in every one of its forms. Iodide alone only acts on certain forms of syphilis, and then not always.

In general and ocular syphilis mercury alone will act as a touchstone, and by its effect clear up a doubtful diagnosis. Mercury, the only specific for syphilis, is at the same time a general poison, and one acting specially on the nervous system, hence the difficulty and gravity of cases of nerve syphilis. Iodide of potassium, as the antidote to mercury, is frequently indicated in syphilis to eliminate or to produce a tolerance to that drug. Iodide of potassium acts specially in diseases of the lymphatics and in rheumatic affections, but severe syphilis is never cured without the exhibition of mercury alone or associated with the iodide.

Mercuric treatment exposes the patient to two results which must be avoided—saturation and mercurial intoxication. These are produced in a direct ratio to the patient's age, and in an inverse ratio to the activity of the metabolism of the tissues. Saturation is recognised when the mercurial treatment which has hitherto caused improvement ceases to be active for good or is even less tolerated by the system. Saturation and intoxication are the clearest indications for the exhibition of the iodide of potassium. Especially in nerve syphilis, where mercury alone is borne badly, the iodide has a beneficial effect in making it agree with the patient. He recommends the subcutaneous injection of half a centigramme of a half per cent solution of cyanide of mercury, in water or glycerine, as being the best borne form of mercurial, being the most soluble, and says it is only where there is an accumulation in the system of the more insoluble forms of mercury that iodide is called for. It should be given in doses not exceeding one or two grammes per diem.

In ophthalmo-cerebral syphilitic diseases of later life—that is, after the age of forty—a cure can only be obtained by the use of a soluble salt of mercury. Iodide of potassium alone has an unfavourable action upon this class of case, and leads to disaster. The treatment by injection should be steadily pursued for eighteen months or two years, and in cases after middle life for three or four years, to obtain a perfect immunity.

C. E. Glascott.

Diseases of the Ear.

BIRMINGHAM (A.). "The muscles of the external ear."—*Dublin Journal of Medical Science*, Oct., 1894.

THE main points the author has sought to establish are—

(1) That the tendinous band which lies on the superior curved line, and is said to represent the transversus nuchæ, gives origin to the middle portion of the occipitalis and to the upper division of the retrahens aurem.

(2) That the occipitalis is made up of three parts—an internal, which arises from the curved line; a middle, from the transversus nuchæ tendon; and an outer, from the mastoid portion of the temporal bone, and that the outermost fibres of the muscle are frequently connected to the ear, while the next fibres send their aponeurosis forward under the attollens.

(3) That the retrahens, in its perfect condition, is composed of a lower division, which arises from the mastoid in connection with the outer part of the occipitalis, and an upper, which springs from the transversus nuchæ tendon.

(4) That the attollens arises from the outer surface, not from the margin of the epicranial aponeurosis, and that it is inserted partly into the outer and partly into the deep surface of the pinna.

(5) That the attrahens is a perfectly distinct and separate muscle unconnected with the attollens, that it lies beneath the temporal artery at a deeper level than that muscle, and that a connection can occasionally be traced between it and the upper part of the frontalis.

(6) That a parotido-auricularis is present in a fair proportion of cases.

(7) That the helix major is an intrinsic muscle of the ear connected above with the attollens.

(8) That there is possibly a connection between the retrahens on the one hand and the obliquus and transversus on the other.

(9) That there is a deep fascia in the scalp between the epicranial aponeurosis and the superficial fascia.

WINTER (W. H.) and DEANESLY (E.). "A case of cerebellar abscess successfully treated by operation."—*The Lancet*, Dec. 8, 1894.

THE patient, a lad aged 16, began to complain of severe earache three weeks before admission to hospital. The pain was severe in the left ear, the head, and the back of the neck. Three days after the onset he

vomited. Five days after the onset a discharge of pus from the ear took place. He lay in bed curled up upon his right side. Three days before admission the eyes were noticed to be turned upwards. On admission respiration was not specially slow, the pulse was 60, and the temperature 97° F. He was drowsy and irritable, and complained of pain all over the head, but especially in the forehead and left parietal region.

The head and neck were turned towards the right side and were kept in that position by rigidity of the muscles of the neck.

There was no mastoid oedema. The left external meatus was filled with inspissated pus. The eyes deviated with the head towards the right. There was slight constant upward deviation of the left eye, slight proptosis of the same eye, and distinct widening of the left palpebral fissure.

There was slight left-sided papillitis of the optic disc. The right disc appeared normal. There was no paralysis of face, tongue, muscles of mastication, or of limbs.

The condition of the patient gradually became worse, and it was deemed advisable to explore the brain for abscess. The operation was conducted upon the lines laid down by Mr. Percy Dean. The lateral sinus was first exposed. The opening thus made was then enlarged upwards and forwards until a portion of the temporo-sphenoidal lobe was in view. This was explored in five or six different places, but no pus found. The opening was now enlarged downwards and backwards, and the surface of the cerebellum exposed. A trochar was thrust inwards and forwards, and struck pus at about 1½ in. from the surface. The opening made into the abscess cavity was enlarged, and a tube inserted. The pulse, which previous to the operation had been 64, rose immediately afterwards to 80. The patient's condition gradually improved, and complete recovery ensued.

HARTMANN (A.): Berlin. "Historical remarks upon the operation for exposing the tympanic cupola-space (attic) and mastoid antrum."—*Archiv. of Otology*, Vol. XXIV., No. 1.

IN order to effect a cure of the processes which take place in the cupola-space, and which include the formation of polypi and the deposition of inspissated or cholesteatomatous masses, this space must be exposed to view. This may be accomplished (1) by cutting through the layer of bone which separates it from the auditory canal, and which is called by Walb the *pars ossea* of the drum membrane. The author uses for this purpose an instrument which he calls a double chisel. (See "Politzer's Text-Book of Otology," third edition, 1893, p. 363). (2) In chiselling the mastoid the antrum is enlarged anteriorly, so that an

unobstructed view can be got into the cupola-space. (3) The entire anterior wall of the antrum and the pars ossea of the drum membrane are removed, and thus a free communication is effected between the antrum and cupola-space and the auditory canal. According to the author, if chiselling be done through the posterior wall of the canal into the drum cavity, the facial nerve or the semicircular canal may be wounded if the chiselling extends 1—4 mm. posterior to the sulcus tympanicus.

Measurements showed in 18 cases that the distance from the spina supra meatum to the facial canal was 15 mm. or less, in two cases 12 mm., and in 2 cases 13 mm., and that the distance from the spina to the external semicircular canal was in 8 cases 15 mm. or less, and in 5 cases 14 mm. The distance from the site of election for the operation (1 cm. behind the spina supra meatum) to the facial canal was in 10 cases 20 mm. or less, and in 4 cases 18 mm., and the distance from the same point to the external semicircular canal was in 11 cases 20 mm. or less, and in 3 cases 18 mm. Hence it follows that in chiselling the mastoid we may strike the facial nerve or the semicircular canal when we have gone in only 12—14 mm. from the spina supra meatum or 18 mm. from the site of election for operation. The distance from the sulcus tympanicus to the facial canal was in 1 case 1 mm., in 2 cases 2 mm., and in 13 cases 3 mm., and to the semicircular canal was in 1 case 4 mm., and in 4 cases 5 mm. In conclusion, the author remarks that without going into an elaborate operation for chiselling into the posterior wall of the canal and exposing the tympanic cavity completely, a permanent cure may often be obtained by the employment of the tympanic cannula, the removal of granulations by the curette, the extraction of ossioles, and in some cases by removing a portion of Rivini's segment with the forceps chisel.

BURNETT (C. H.). "The surgical treatment of chronic otorrhœa."—*Journal of the American Association*, Oct. 15, 1894.

In cases of chronic suppurative middle ear disease, where cure of the suppuration is not effected by the instillation or insufflation of medicaments upon the diseased parts, it will usually be found that one or more of the auditory bonelets are necrosed, or that the tympanic wall in apposition to the necrosed bonelets is itself carious. In such cases the obvious indication is to excise the diseased bonelets and their remnants in order to remove septic material from the drum cavity. In "attic" suppuration, in which necrosis of one or more ossicles is present, and in which the sole perforation is in the membrana flaccida, excision of the remnants of the membrane and the ossicles is specially indicated. This

operation is merely the first step in the antiseptic treatment of the ear. After the "excision" operation a case of chronic purulent middle ear disease has a much better chance of getting well, and there is also less chance of extension to the brain. The author advises that the patient be placed under the influence of a general anæsthetic, preferably ether, during the performance of the operation. All carious ossicles, excepting the stapes, must be removed from the drum cavity, and all diseased mucous membrane, granulations, etc., be thoroughly got rid of. The effect of this improved drainage and more direct means of treating the suppurating cavity is to give hopes of a speedy cure. The author warns against curetting the cavity of the middle ear, for fear of producing facial paralysis, and rests content with merely removing diseased ossicles, the remnants of the membrana tympani, and polypi.

CLARK (S. B.). "Post-mortem demonstration of a case of pyæmia following a latent otitis media."—*Med. News*, Jan. 5, 1895.

In this case the patient, a man aged 21, was admitted into hospital complaining of having been sick for three weeks. He complained of chills, fever, epistaxis, loss of appetite, and general debility. Malaria was suspected, but an examination of the blood proved negative. Severe pulmonary symptoms developed, and the patient died in an exhausted condition.

Post-mortem examination showed numerous septic foci in the lungs, adherent pleura, pericardium, etc.

The right internal jugular vein, from its commencement at the jugular foramen to the right innominate vein, was found to be in a condition of suppurative thrombo-phlebitis, and contained a semi-solid mass of foul, viscid, purulent material from beginning to end. In addition, the lateral and other sinuses of the dura mater were in a suppurative thrombo-phlebitic condition. A septic focus was found in the middle ear and another in the mastoid cells, and leading from this the veins connecting with the lateral sinus were found in a condition similar to the internal jugular vein.

FRIEDENWALD (H.). "Necrosis of the labyrinth."—*New York Medical Journal*, February 23, 1895.

In this case the patient, a female child, aged 4 years, came under the author's treatment, suffering from left-sided chronic suppurative middle ear disease, following an attack of scarlatina. On examination, a large polypus was found in the auditory meatus. This was at once removed, but upon the following day the patient had a chill and high fever, the

temperature reaching 103·6° F. Great pain was complained of in the head. After consultation, it was decided to open the mastoid process. This was accordingly done. The wound closed rapidly, but the otorrhœa continued, and the polypus returned. This was again removed, and chromic acid applied to the base.

After many attempts to get rid of the polypus, Kuster's operation was undertaken, and the carious cavity well scraped and thoroughly packed. The otorrhœa, however, again recurred. Finally, a sequestrum found its way into the auditory meatus, and was removed. The sequestrum was small, and was evidently part of a semicircular canal, crescentic in form, thicker at one end than at the other, and its surface rough. From this time the patient made an uninterrupted recovery.

SPIERS (H. H.). "Cyst of the auricle."—*Cincinnati Lancet-Clinic*, December 1, 1894.

THE patient, a man aged 52, stated that four months previous to his taking advice, he had noticed a hard swelling upon his right ear, which had gradually become larger. The tumour was found to involve the helix and the upper part of the antihelix and the fossa between these parts. After the introduction of an aspirating needle, about half an ounce of thick reddish coloured fluid was withdrawn. Two drachms of an ethereal tincture of iodine (1dr.—1oz.) was injected. This was followed by perfect cure.

MACKENZIE (HECTOR). "Hysterical deafness."—*Lancet*, March 16, 1895.

THE author remarked that the important points in making a diagnosis of hysterical deafness were (1) the association of deafness with undoubted symptoms of hysteria; (2) the sudden development of the deafness after some emotional disturbance or shock, or after trauma; (3) the absence of any sufficient cause for deafness in the auditory apparatus itself as shown by the ordinary methods of examination; (4) the impairment of bone conduction of sound to at least as great an extent as aerial; (5) the frequent co-existence of anæsthesia of the pinna and external meatus.

In this case the patient was a girl aged 16 years. In November, 1891, she had an attack of sore throat during an undoubted outbreak of diphtheria at a boarding school. In January, 1892, she had a slight attack of influenza. As she suffered from earache at this time her medical attendant Politzerised her. The girl screamed, and from that moment was extremely deaf. Galvanism was subsequently ordered locally and strychnine internally. Numbness in the limbs soon set in, and the girl became anæsthetic all over except on the head and

neck. She also lost power in the legs and arms. She was treated with massage and electricity, and gradually recovered sensation. She, however, continued quite unable to hear, to raise herself, or to use her legs. Various forms of treatment were tried, but no effect could be produced upon her hearing capacity. The deafness had lasted for more than two years when the patient came under the author's treatment. The plan adopted was that suggested by Dr. Gilles, and consisted in attempting to re-educate the sense of hearing much in the same way as she had been re-educated in walking. The patient was made to listen to and to try to count the ticking of a clock at increasing distances, to listen to and to attempt to repeat words and sentences spoken first close to the ear and then farther and farther away. A clock was used, and gradually she succeeded in hearing the ticks at greater and greater distances. Words also were used first spoken near the ear, and then at gradually increasing distances. After ten days' practice she had so far improved as to be able to carry on an ordinary conversation. A few weeks afterwards the hearing had become of normal acuteness. Great improvement also took place in her mental condition. At the time of reporting, now a year since, she had retained her hearing; the good result had been maintained.

RANSOM (W. B.) "A case of functional deaf-mutism."—*British Medical Journal*, March 2, 1895.

THE patient, a male, aged 19, came to hospital with the history that three weeks previously he had gone to bed in his usual health, but had wakened up in the morning unable to hear or to utter a sound. When a cannon was fired off close to him he was quite unable to hear it. He could neither talk, whisper, nor utter inarticulate noise. He showed no evidence of undue emotion or of hysteria. An important point in his previous history was that a year before he had suddenly lost the use of his right arm, which had remained paralysed for three weeks. No definite history of congenital syphilis could be made out with regard to the patient. He was obviously very deaf, but when a simple order was spoken loudly into either ear, the order was in some instances obeyed. All attempts to make him speak failed. He was, however, able to write intelligent replies to written questions.

Careful physical examination revealed nothing wrong. A fortnight after his first visit the patient presented himself again, the symptoms having remained unchanged. He now, however, showed anæsthesia of the palate reflex, and a sudden movement of the hand before his eyes failed to make them blink. The case was considered to be one of hysterical deaf-mutism. Accordingly a faradic current was sent through the

larynx by means of an intra-laryngeal electrode, and one upon the front of the neck. The result was a kick and a yell. He returned home hearing and speaking normally, after being deaf and dumb for five weeks. The diagnostic points of hysterical deaf mutism are (1) sudden origin, (2) existence of absolute aphasia and aphonia, (3) absence of signs of labio-glossal paralysis and usually of any paralytic phenomena, though hysterical hemiplegia may co-exist; (4) preservation of intellectual faculties and the power of writing; (5) frequent co-existence of hysterical stigmata; (6) usually rapid recovery, though it may be gradual.

In the above-mentioned case the onset was somewhat peculiar, as there seemed to have been no antecedent shock or emotion, and the patient could not say exactly when it began. In addition, hardly any of the ordinary symptoms of hysteria were present. The mode of cure well illustrates the intimate association of the ideational centres.

DALBY (SIR W.). "Hysterical (so-called) and functional deafness."—*British Medical Journal*, March 16, 1895.

SIR W. DALBY, in referring to the case of "Functional deaf-mutism," recorded by Dr. W. B. Ransom in the *British Medical Journal*, of March 2nd, 1895 (*vide supra*), relates the following interesting case: The patient, a young lady, aged 17, was found one morning by her relatives to be absolutely deaf to all sounds. Her voice was not affected as to tone. Upon examination the external and middle ears were found to be perfectly healthy. She, however, appeared to be completely deaf. The author suggested, in order to cure the condition, that she should walk through two rooms into a third, and that as she entered the third room, from a point where she could not see, a gun should be fired. For certain reasons this plan of treatment was objected to, and the patient disappeared from the author's sight. About six months afterwards, she came down one morning to breakfast, hearing quite well. The author remarks that in such cases the history usually is that the patient is perfectly well the night before, and that the deafness is discovered in the morning when first awaking or when alone. In persons, who from one cause or another, lose all perception to sound, the deafness comes on at all sorts of times, and frequently in the presence of other people.

Those cases where the hearing is really lost, either for a time or permanently, help to show what the author has for long maintained, that the sense of hearing is often apt to be lost from emotional causes, although what the exact explanation of this is is doubtful. They also help to show that there can be no true hysterical loss of hearing any more than there can be a hysterical loss of smell, or of any other special sense.

W. Milligan.

Pathology and Bacteriology.

CRISTIANI (H.). "Effets de la thyroïdectomie chez les lézards."—
Société de Biologie, January 13, 1894.

In lizards the main portion of the thyroid is in the form of a cravat, and is found at the base of the neck. Extirpation of this portion is easy. In addition, however, there is a small lateral gland on the left of the trachea, immediately above the heart, which has a structure remotely resembling that of a thyroid body, and is very difficult of removal. There were eighteen complete thyroïdectomies without complications. The day following the operation the animals were feeding almost as well as before. After a lapse of a few days in some, but in the majority during the second and third week, the animals were noticed to become less agile. Later they became somnolent and died within a month of the operation, after refusing food for several days. Control experiments were performed, such as simple opening of the neck, amputation of a limb or tail, but the animals on which these operations were performed lived several months.

Complete extirpation of the thyroid, therefore, caused death to result much earlier than equally severe operations without thyroïdectomy.

CRISTIANI (H.). "Effets de la thyroïdectomie chez les serpents."—
Révue Médicale de la Suisse Romande, January, 1895.

DR. CRISTIANI reports twenty-two cases of extirpation of the thyroid performed in adders; several other thyroïdectomies were complicated by accidents during the operation, and are excluded from the list.

The thyroid body of the adder differs in form and position from that of the lizard. It is of an elongated oval shape, and is very adherent to the great vessels of the neck, which it is difficult to avoid wounding during the operation. The gland is single, and placed laterally. There is no accessory gland as in the lizard.

Anæsthesia was produced by ether, and an incision was made in the middle line of the neck, and the thyroid exposed. The gland is easily recognised by its deep colour, and it lies on the whitish corpus adiposum. On recovery from anæsthesia no symptoms appeared until after a lapse of from four to nine days, when they were observed to be less agile. Adders not operated on, and adders which had been subjected to such severe operations as excisions of the corpus adiposum, or excisions of a portion of the thyroid, manifested no change. When the thyroïdectomised animals were placed on the hand they made scarcely any attempt to get away.

In a few cases convulsions were noticed, and in one case they were very marked, the head being raised and the animal being convulsed several times. All the thyroidectomised animals died in from four to twenty-seven days, whereas the others, whether operated on without thyroidectomy, or those not operated on, lived for several months. In adders, as in lizards, extirpation of the thyroid would appear to produce grave and fatal effects analogous to those observed in mammals; the symptoms, it is true, are less manifest and more difficult to analyse, but death appears to be the ultimate result.

GLEYS (E.) and PHISALIX (C.). "Note préliminaire sur les effets de la thyroïdectomie chez la salamandre."—*Société de Biologie*, January 13, 1894.

Two salamanders were thyroidectomised. On the following day they refused food, but other salamanders subjected to equally severe operations showed no change. On the second day after thyroidectomy great difficulty in walking was noticed, the fore-legs, being spasmodically contracted, were raised slowly and with difficulty. The head was also raised, which is not normally the case. When frightened, the animals could not escape, owing to the spastic paresis. On the third day they died.

Another case presented similar symptoms to the above on the sixth day, and died on the eighth or ninth day.

These experiments show that extirpation of the thyroid in an inferior vertebrate produces grave symptoms and death.

NICHOLAS (M. A.). "Note sur les effets de la thyroïdectomie chez la salamandre."—*Société de Biologie*, January 13, 1894.

Four successful thyroidectomies were performed. One died eight days, two seven days, and the fourth some days after the operation. In the first few days nothing unusual was noticed. About the fifth or sixth day there had gradually developed a striking change in the gait of the animals. They walked slowly, with the fore-legs completely extended, and the ventral surface of the thorax and abdomen raised as far as possible from the ground, which normally they almost touch for the whole length. As soon as one fore-leg was raised from the ground the other gave way, being unable to support the weight of the body, owing to spasmodic contraction and paresis of the fore-legs. The hind legs were semi-flexed. The general gait when walking was quite different from normal, and might be called "ataxic."

Later, the animals would not move unless stimulated strongly, and at last they became absolutely inert and died. At the autopsy pallor of

the organs was observed, and the liver was greyish yellow. In each case the stomach and intestines contained only mucus, showing that the animal had not eaten for some time before death, but it is certain they did not die of inanition, as ordinary salamanders deprived of food last very much longer.

J. Gray Clegg.

GARROD (ARCHIBALD E.). "On the pigmentation of uric acid crystals deposited from urine."—*The Journal of Pathology and Bacteriology*, Vol. III., No. 1, November, 1894, p. 100.

ALTHOUGH the colouration of uric acid crystals deposited from urine is such a familiar fact in clinical medicine the nature of the pigment or pigments to which the crystals of this colourless acid owe their tints is but little known.

Deposits of uric acid, as regards their pigmentation, may be conveniently classified into four groups:—

(1) "Cayenne pepper" deposits, which are the commonest, and which, when seen in bulk, have a more or less intense red colour. They are composed of crystals, which, examined in detail, have a warm orange tint, occasionally verging upon red.

(2) Yellow- or fawn-coloured deposits, consisting of yellow crystals, which often show a tinge of brown.

(3) Deposits coloured by abnormal pigments, occasionally present in urine, which appear brown or black when seen in bulk.

(4) Brown deposits, thrown down by the addition of mineral acids to urine.

Not only do the pigments produce varying tints and colours, but they also appear to play a very important part in determining the form of the crystals. Sir William Roberts also believes that the pigments may retard the separation of free uric acid from solutions of the quadrates.

Garrod, in his research, has attempted to throw light upon this question of colouration of uric acid crystals, by methods of precipitation from solutions containing the several urinary pigments in as pure condition as possible. The solutions of urate employed were obtained from dry and clean snake's urine. The following are the conclusions arrived at:—

(1) Of the true urinary pigments, which exist ready formed in urine, only the normal yellow pigment (urochrome) and uroerythrin appear to possess the property of colouring uric acid crystals deposited from their solutions.

(2) The yellow pigment, being a constant constituent of the urine, always furnishes the ground tint of the crystals, and plays the more important part in determining their form; the whetstone or canoe shape being that which this substance specially tends to produce.

(3) In the majority of instances uric acid crystals, which are spontaneously and rapidly deposited from urine, contain uroerythrin also, and it is to this pigment that the sediments owe their red colour when seen in bulk.

(4) The various shades of orange and red observed in the individual crystals are due to the admixture, in varying relative proportions, of the above two pigments; and although crystals coloured by the yellow pigment alone are sometimes met with, uroerythrin is never the sole colouring matter of the natural sediments.

(5) The minute quantity of iron present in the sediments is not a constituent either of the yellow pigment or of uroerythrin.

(6) Other pigments occasionally present in urine, which have a share in the colouration of the crystals in some cases, are the brown products produced by the action of mineral acids, the oxidation products of phenol derivatives, and the pigments of the bile.

(7) Urobilin and hæmatoporphyrin take no part in the colouration of the crystals.

Garrod accompanies his paper with admirable coloured illustrations.

RAKE (BEVAN). "A note on the percentage of iron in the liver in ankylostomiasis."—*The Journal of Pathology and Bacteriology*, Vol. III., No. 1, November, 1894, p. 107.

In pernicious anæmia an excessive destruction of red blood corpuscles appears to occur, and possibly in the portal circulation. Certainly an increased percentage of iron is met with in the liver as compared with other organs.

Since the ankylostoma duodenale produces symptoms closely resembling those of pernicious anæmia, a comparison of the pathology of the two diseases is at once suggested.

The anæmia in ankylostomiasis may be due (1) to loss of blood from the wounds inflicted by the sharp chitinous hooklets of the ankylostoma; or (2) to the absorption from the intestine of some poisonous agent produced directly or indirectly by the parasite.

To elucidate this question, taking the liver and spleen as indicators, the author records the results of analyses in five cases of ankylostomiasis, as regards percentage of iron:—

Case.		Liver.		Spleen.
1	...	Trace	...	·04
2	...	·26	...	3·28
3	...	·2068	...	Not examined.
4	...	·0123	...	·0592
5	...	·0228	...	·071
Average percentage.....		·100		·862

In a table given by Hunter, it is shown that in eight analyses of the liver of pernicious anæmia by Quinke, Zaleski, Rosenstein, and Stahel, the average percentage of iron is .713, the range being from .364 to 2.01. In 14 analyses of the liver in other diseases by the same observers the average percentage is .203.

In pernicious anæmia the percentage of iron in the spleen is, as a rule, but little affected, and as far as can be inferred from the above figures, the same obtains in ankylostomiasis.

The author draws the following conclusions :—

(1) In ankylostomiasis the average percentage of iron in the liver is less than in other diseases, and is very much less than the average percentage in pernicious anæmia.

Ankylostomiasis	=	.1 per cent.
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Pernicious anæmia	=	.7 „
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Other diseases	=	.12 „
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(2) The iron in the spleen is scarcely affected in ankylostomiasis.

(3) The intense anæmia associated with ankylostomiasis is simply due to loss of blood from the intestine, and is not caused by any toxic blood destruction in the liver.

T. N. Kelynack.

LUNKEWICZ. "The bacteriological application of the 'Griess-Ilosvay' test for nitrites."—*Centralblatt. für Bakt.*, Band XVI., s. 945.

ILOSVAÏ'S test solution is made as follows :—In 20 parts of distilled water 0.1 parts of naphthylamin are boiled, the solution is allowed to stand, and the clear fluid is decanted or filtered off and added to 150 parts of dilute acetic acid.* A second solution consisting of 0.5 parts of sulphanilic acid in 150 parts of dilute acetic acid is made. Equal parts of the two solutions are mixed to form the test solution. This is so delicate a test that the solution becomes discoloured when exposed to air, but can be kept 1—2 months in stoppered bottles. Since Witte's peptone gives the reaction and liquefied gelatine also, Mertz's "peptonum siccum ex albumine" or ordinary meat infusion must be used as a cultivation medium, and gelatine cultivation must be hardened by freezing before this test is applied.

When fluid cultivations are to be tested the reagent is added in the proportion of one-third the volume of the cultivation : peptone cultivations give a rubin red, bouillon a light yellowish red, if nitrites be present. Gelatine slab and plate cultivations also give the reaction. The cultivations of the vibrio of cholera, *B. coli* com. and *B. typhi* murium give the reaction ; also the sp. metchnikovi, but later than that of cholera.

* 4.9 per cent acetic acid.

The cultivations of *B. typhoides*, *anthracis*, *mallei*, *mesentericus vulgatus*, *proteus vulgaris*, *staphylococci pyogenes*, *aureus*, *albus*, *et citreus*, *streptococcus erysipelatis*; the vibrios of Finkler, Miller, Deneke, and Günther (*V. aquatilis*) do not give the reaction.

The reaction appears to furnish an additional test, easy of application, by which similar bacteria may be differentiated. This reaction is given by the alpha-naphthylin.

J. Richmond.

Anatomy.

MOTT (F. W.). "Experimental inquiry upon the afferent tracts of the central nervous system of the monkey."—*Brain*, Part I, 1895.

IN the introduction to the account of his experiments Dr. Mott draws attention to the great care which must be taken in the operative procedure to prevent mechanical injury to any part except that which the operator desires to investigate, and, in addition, the wound must be perfectly aseptic and the antiseptics used must be of a non-irritating character.

The experiments described are arranged in three groups:—(1) Unilateral sections of the roots of the lumbo-sacral region of the spinal cord; (2) median sections of the spinal cord in the lumbar region; (3) unilateral separation of the nuclei of the posterior columns from the arcuate fibres which arise out of them.

The results of the experiments are summarised in their relation to—(1) Goll's column and its nucleus; (2) the antero-lateral columns; and (3) the effects of median sections.

(1) Goll's column is formed principally by fibres from the fifth, sixth and seventh sub-thoracic roots, but some fibres, which constitute a small posterior triangle, come, presumably, from the tail. The fibres of Goll's column end in the nucleus of the funiculus gracilis. When this nucleus is destroyed, or the fibres arising from it are separated from the cells, degeneration occurs in the internal arcuate fibres, the opposite inter-olivary layer and the fillet, and it can be traced up to the optic thalamus. "*In no case could degenerated fibres be traced to the cortex.*"

(2) A few degenerated fibres are found in the lateral column of the same side after unilateral section of the roots, but none in the direct cerebellar tract after section of roots below the second lumbar. The degenerated fibres found in the opposite antero-lateral column after unilateral sections of roots are not always present and are, therefore,

probably derived from cells in the grey matter of the same side, which have been damaged by vascular changes. These fibres form a small tract internal to the ventral cerebellar tract.

(3) After median section in the lumbar region for three-quarters of an inch there is symmetrical degeneration in the antero-lateral tracts of both sides, and the degenerated fibres form two sets:—(a) The ventral cerebellar—the more numerous and situated the more peripherally. They are traceable to the vermis, looping over the fifth nerve to the superior cerebellar peduncle and descending on its posterior aspect to the middle lobe of the cerebellum. (b) The crossed afferent tract of Gowers and Edinger, which probably rises from cells of the grey matter, its fibres decussating in the anterior commissure. The fibres occupy the same position but are more numerous than the small tract observed after unilateral sections of posterior roots. They can be traced to medulla, pons, and, lying to the outside of the lateral fillet, to the corpora quadrigemina, a few apparently extending to the optic thalamus.

"The fact that the *ventral cerebellar tract is equal and symmetrical in these vertical lesions, whether the incision occupies the mid-line or not*, shows that it, like the crossed afferent tract of Edinger, is a *crossed cerebellar tract* coming from the cells of the grey matter, possibly at the base of the anterior horn."

BERKLEY (HENRY J.). "The finer anatomy of the infundibular region of the cerebrum, including the pituitary gland."—*Brain*, Part IV., 1894.

THE pituitary body remained for a long time an enigmatical structure and its general relations were not thoroughly understood until its essential features were explained by the investigation of its development. It is now known that it consists of three parts, a glandular organ developed from the roof of the mouth, a duct leading from the cavity of the brain to the mouth, and an associated group of nerve cells which are specially associated with the upper and back part of the duct. The three parts are quite distinct in the lower vertebrates but in the higher forms the primitive distinctness is lost, the duct and nervous part are intimately blended, the duct does not open into the mouth, and it is generally stated that the nervous tissue is almost entirely masked, if not obliterated, by great proliferation of connective tissue. Dr. Berkley's observations, which have been made chiefly upon dogs, demonstrate the presence of all three parts of the organ, but what is more interesting, they prove that the nervous structure is by no means lost; on the contrary, if the tissue is properly prepared, by the Golgi method, the nervous tissues are very evident. In the anterior or glandular part of the organ there are only

nerve fibres which follow the vascular channels and are distributed upon the walls of the follicles. In the posterior and upper part there are also follicular spaces, but, in addition, there are many more cells of varying character. Some are large, irregularly pyramidal or oval, with many dendrites and one axis cylinder process; others are of medium size, of very irregular form, provided with many dendrites, and one axis-cylinder process. Some are flask-shaped with numerous processes, two or more of which are axis-cylinder processes; and, in addition, there are small pyramidal and round cells of nervous nature.

In the infundibulum, which leads down to the pituitary body, the neuroglia elements are relatively preponderant, but the nerve cells of varying forms are also abundant.

As Dr. Berkley remarks, it is curious to find structures, which are essentially the same as those present in the lowest vertebrates, preserved in so high a form as the dog, for the function of the nervous portion of the organ was the testing of the water passed through the tubular channel between the mouth and the brain, and that function is undoubtedly lost; indeed it has never been utilised in the higher forms.

TURNER (WILLIAM ALDREN) and BULLOCK (WILLIAM). "Observations upon the central relations of the vago-glosso-pharyngeal, vago-accessory, and hypo-glossal nerves."—*Brain*, Part IV., 1894.

As the result of their clinical and post-mortem observations, the authors arrive at the following conclusions:—

(1) That the hypoglossal chief nucleus is the only source of origin of the root fibres of the hypoglossal nerve. The *fibræ propriæ* of the nucleus are in large part derived from the pyramids. The other afferent fibres come from the *formatio reticularis*.

(2) The *nucleus ambiguus* is the nucleus of origin of the motor vago-glosso-pharyngeal and vago-accessory root fibres, and is the source of innervation of the *levator palati* and internal thyro-arytenoid muscles, and probably also of the nuclei of the pharynx.

(3) The posterior vago-glosso-pharyngeal nucleus is the end nucleus of the axis-cylinder processes of the cells in the ganglia upon the trunk of the glosso-pharyngeal and vagus nerves.

(4) The facial nerve trunk receives a large accession of fibres from the posterior longitudinal bundle of the opposite side, which probably comes from the oculo-motor nucleus.

(5) The postero-lateral cell group of the anterior horn of the spinal cord is least and latest affected in chronic progressive poliomyelitis, and, as shown by Mingazzini, is probably associated with the reflex mechanisms of the spinal cord.

GRIFFITHS (JOSEPH). "Observations on the urinary bladder and urethra. Part II. The Nerves."—*Journal of Anatomy and Physiology*, Vol. IX., Part I, Oct., 1894.

IN this communication Dr. Griffiths continues an account of his observations upon the urinary bladder and urethra. He has already shown in a previous paper that the muscular fibres of the bladder are not arranged in two or three different planes—external, middle, and internal—the fibres running in different directions in each plane; but the fibres run both from one direction to another, and from one plane to another; and fibres which are longitudinal in an external plane at one point may be circular in direction at another point in an internal plane.

In addition to this disproof of the generally accepted statement that there are three alternating layers of muscle in the bladder wall, Dr. Griffith has also pointed out the fallacy of the belief in a thickened layer of circularly disposed muscle fibres round the neck of the bladder, and he proved that the so-called external sphincter of Henle is only the commencement of the constrictor urethra, which begins near the point where the genital ducts enter the urethra.

In the present communication he describes the nerve supply of the muscles and discusses the functions of the nerves. The nerve supply to the bladder is bilateral, and each set of nerves is divided into two groups, one coming directly from the sacral part of the spinal cord, the other indirectly from the lumbar cord through the abdominal sympathetic system of nerves; the former are the pelvic splanchnic nerves (*nervi erigens*), the latter are the hypogastric branches, and the two sets unite before being distributed to the bladder.

The nerve supply of the mucous membrane of the urethra and the muscles of the urethra and penis is derived from the pudic nerve.

The pelvic splanchnic nerves rise from the second and the first or third sacral nerves, occasionally from both the latter. They unite at the side of the anterior part of the rectum with the hypogastric nerve, and at the point of junction there is a large flat ganglion. The fibres which pass from the ganglion unite to form a plexus, in which there are many small ganglia (*plexus gangliosa*), and from this plexus the terminal nerves pass out in three sets; the first to the fundus, the second to the body, and the third to the lower part and the first portion of the urethra.

The hypogastric nerve probably receives branches from the lumbar sympathetic cord and from the aortic plexus. Its fibres are mostly non-medullated, but there are one or two large medullated fibres.

The pudic nerve supplies the muscles of the urethra and the external sphincter of Henle and the compressor, the muscles of the penis, the mucous membrane of the urethra, and the skin of the penis.

Stimulation of the peripheral end of the divided left splanchnic nerve causes contraction of the left half of the bladder, and the contraction involves all the muscles in the left half of the wall.

Stimulation of the central end of the divided splanchnic nerve (the opposite nerve being intact) causes slight contraction of the bladder, which also takes place if both hypogastrics are divided, but which disappears if the opposite nerve is divided.

In addition to the effect upon the opposite side of the bladder the inspiratory efforts increase both in depth and force until inspiratory dyspnoea is produced, and this effect results from a stimulus which can scarcely be felt by the tip of the tongue; therefore the pelvic splanchnic nerve is both efferent and afferent.

Stimulation of the peripheral end of the divided hypogastric nerve causes contraction of one half of the bladder exactly similar to that produced by the splanchnic nerve, but smaller in degree; but this is not the only effect, for if the bladder be previously contracted stimulation of the peripheral and of the divided hypogastric nerve produces an initial contraction followed by a rapid and pronounced relaxation.

Stimulation of the central end of the divided hypogastric nerve, when the other nerves are intact, produces a slight contraction of the bladder, which is abolished by section of both pelvic and splanchnics, but no farther effect.

The function of the hypogastric nerves is unimportant, and it has been shown by Mosso and Pellicani that complete removal of portions of them does not interfere with the functions of the bladder.

When the peripheral end of the pudic nerve is stimulated the muscles of the urethra and penis contract in sequence from behind forwards. Stimulation of the central end of the pudic nerve produces the ordinary effects resulting from stimulation of a sensory nerve, and, in addition, a slight contraction of the bladder—too slight to be noticed by the naked eye. If the bladder is already in a state of tonic contraction, stimulation of the central end of the divided pudic nerve produces a transient contraction followed by relaxation—that is, the same effects as those resulting from stimulation of the hypogastric nerve.

From a consideration of these results, Dr. Griffiths is led to ask whether the common form of retention of urine after operations is the result not of undue activity of the striped muscles of the urethra, but of inhibition of the muscular wall of the bladder? He purposes returning to the consideration of this interesting question in a future communication.

MAURER (F.). "The elements of the body muscles : a contribution to the phylogeny of the striate muscles."—*Morphologisches Jahrbuch*, September, 1894.

IN a most exhaustive study of the striate muscles in amphioxus, the various groups of fishes, amphibians, reptiles, birds, and mammals, Dr. Maurer points out that the contractile elements consist of muscle cells and muscle fibres. All observers are agreed that the former are simple cells, but there is no such unanimity of opinion concerning the latter; no one doubts that they are complex structures, for they possess many nuclei, but, in the opinions of Remak, Kölliker, M. Schultze, Wilson, and Weismann, each fibre is produced from a single cell, whilst v. Wittich, Leydig, Margo, and Deiters believe that a striped muscle fibre is formed by the fusion of several adjacent cells. Moreover, the differences of opinion extend not only to the origin of the fibres, but also to their structure, for, whilst it is now universally believed that the striæ of the fibres are produced within the cells, it cannot be forgotten that Rouget has contended that they are formed outside of the fibres by connective tissue cells.

The nature of the fibrils and striæ is also a matter of dispute. Van Gehuchten and Ramón y Cajal look upon the fibrils as artificial products, the essential contractile substance of the fibre being the sarcoplasm. Marshall and Leydig recognise the fibrils and striæ as the optical expressions of an intra-cellular network, which, in Marshall's opinion, is composed of longitudinal contractile elements and transverse elastic bands; but Rollet has shown that the fibrils appear at a very early stage, and when they are first formed they lie only at the periphery of the fibres and are completely isolated from each other; consequently they cannot be parts of an intra-cellular network.

In its adult condition each striate muscle fibre is generally described as being surrounded by a membrane, the sarcolemma, which is looked upon as a cell membrane by those who believe in the unicellular origin of muscle fibres; others look upon it as a connective tissue sheath, and Schneider denies its existence.

Dr. Maurer's extensive observations lead him to a series of conclusions which partly support and are partly at variance with those generally accepted as most correct. They will, no doubt, be discussed, and either verified or confuted by subsequent enquirers, but they are based upon a strong foundation, and are therefore most worthy of very careful consideration.

He finds:—(1) That the muscular rudiment of each segment of the body, which is at first composed of epithelial cells, becomes converted into a multinucleated protoplasmic mass; subsequently this mass is divided, by a series of longitudinal folds, which pass from within

outwards, into a number of flat nucleated longitudinal bands, and the peripheral protoplasm of each muscle band develops a number of longitudinal transversely striated fibrils. The interstices between the muscle bands become occupied by connective tissue elements which unite to form lamellar septa. At a later period the fibrillation extends throughout the whole of each muscle band, and the striated protoplasm is cleft into numerous longitudinal bundles; the outermost of these bundles become surrounded by connective tissue septa, which pass between them from the lamellar septa between the muscle bands. This comparatively primitive condition remains permanent in lampreys, but in the hag fish and the sturgeon the connective tissue septa extend further into the interior of the muscle bands and surround each of the longitudinal divisions into which the protoplasmic mass becomes cleft; in higher forms each of the longitudinal bundles becomes further cleft into smaller portions.

(2) Each primitive muscular band develops around itself a structureless membrane, the sarcolemma, and each longitudinal bundle into which a muscular band is cleft develops a similar structureless sheath, therefore the sarcolemma is a cuticula. There are two sets of muscle nuclei, the peripheral and central; both remain in the lower forms, but in the higher animals the central nuclei *disappear* and the peripheral remain as the sarcolemma nuclei.

(3) Other modes of formation of muscle fibres, *i.e.*, formation by outgrowth from a cell or by the transformation of closely associated spindle-formed cells, must be looked upon as cœnogenetic modifications of the typical developmental process.

Arthur Robinson.

Reviews.

“The Dyspepsia of Phthisis; its Varieties and Treatment.” By W. SOLTAU FENWICK, M.D., B.S. Lond. London: H. K. Lewis, 1894.

IN this work the term dyspepsia is used in a very wide sense; morbid conditions found not only in the stomach but also in the intestines, in cases of phthisis, are included, and the clinical features of those cases presenting signs of disturbances of digestion, which may precede or accompany different stages of pulmonary tuberculosis are also considered.

The first chapter deals with the various morbid states of the stomach which may be found in cases of pulmonary tuberculosis, such as dila-

tation, chronic catarrh, hæmorrhagic erosions, follicular ulcerations, and tubercular disease.

In the second chapter, the pathology of the gastro-enteritis of phthisis is considered.

The third chapter is on the relation of organic disease of the stomach to pulmonary tuberculosis.

The fourth chapter considers the dyspepsia of strumous children.

The fifth chapter treats of a form of dyspepsia which often precedes the development of pulmonary tuberculosis.

The sixth chapter is devoted to the dyspepsia which usually ushers in and accompanies the first stage of phthisis.

In the seventh, the variety of dyspepsia accompanying the final stage of phthisis is considered ; and in the eighth and last chapter, complications of phthisis, such as perforation of the intestinal tract, tubercular disease of the intestines, and ulceration of the appendix vermiformis are described.

It is probable that the fourth, fifth, and sixth chapters will be the most interesting to medical men, and especially to those who have much to do with tubercular pulmonary cases.

In the chapter on that form of dyspepsia which often precedes the development of tuberculosis, Dr. Fenwick recognises two forms of digestive disturbances, which he terms the atonic and the irritative varieties. The symptoms and progress of such cases are carefully considered, and as regards the etiology of the affection, Dr. Fenwick believes that both the tubercular disease and the dyspepsia are dependent upon the same constitutional dyscrasia. He says that it is generally held that dyspepsia stands in a causal relation to the pulmonary disease, the tubercular invasion being a direct consequence of the gastric disorder. He shows, however, that one variety of dyspepsia is very prone to attack persons who show a constitutional predisposition to tuberculosis, and is, therefore, inclined to believe that any interference with the general nutrition, such as that which may arise from severe dyspepsia, by diminishing the resistance of the tissues, will readily conduce to the inception of the hereditary disease.

The treatment of this form of dyspepsia preceding phthisis, as well as of the dyspepsia met with during the course of tubercular lung disease, is very carefully considered, and the work impresses us as the result of a large amount of experience, and of very carefully drawn conclusions from personal experience as well as from the writings of others.

Dogmatic assertions, as to the exact connection between the symptoms of gastric disturbance and pulmonary phthisis, are carefully avoided, and the whole subject is treated in a scientific and able manner.

"The Difficulties of Prognosis in Insanity." By HENRY SUTHERLAND, M.A., M.D. London: John Bale and Sons. 1895.

THIS excellent little book puts forth in a few pages some of the difficulties of prognosis in insanity, together with most valuable hints which will enable us to answer the questions: Will the patient recover mental health? If so, how soon? Will he die of the mental disease? If he recovers will he have another attack? If he remains permanently insane, will his life be a long or a short one?

The important points to be considered in the prognosis of insanity are, age, number of attacks, the form of insanity, the duration of attacks, the cause of attack (such as sunstroke, syphilis, alcohol, etc), the kind of delusion present, and the kind of insane habits present. Dr. Sutherland deals with these in a masterly style, showing that he has acquired his knowledge of insanity in the only way by which it can be acquired, that is, by actual residence in an asylum. He illustrates all his points with cases which are related in such an admirable manner that a difficult subject is made a very interesting one.

The little volume closes with an account of the various ways by which a mental specialist examines a patient in order to say whether he has recovered or not; for be it remembered that many of the insane can, and do, hide their delusions in order to be liberated, and the greatest difficulty sometimes arises in saying when a patient is sufficiently recovered to assume his ordinary relations with the world at large.

"Essays on Rural Hygiene." By GEORGE VIVIAN POORE, M.D., F.R.C.P. Second Edition. London: Longmans, Green, and Co.

THERE is much in these essays which is deserving of praise. They are not merely instructive; they are also interesting. They are popularly written; but they are clear in expression. They deal with matters affecting health which are to be found in the soil, the air, water, and the dwelling, and they are worthy of the attention not merely of the ordinary layman, but also of the medical practitioner. It is not necessary that the reader should agree with everything in these essays, which Dr. Poore sets forth as being his opinions; but it is plain that he has provided ample food for thought, and plentiful suggestions for practice in everyday life. The title of the volume suggests that it deals with the scientific application of sanitary principles under the simplest—therefore, "Rural"—conditions; but it will be found that the essays contained in it by no means ignore more complex—conversely, "Urban"—situations. There is, indeed, an apparent anomaly in the title of "Rural Hygiene." It is true that the greater number of the pages deal

with rural and semi-rural problems of hygiene, and that the chapters on "Personal Experiences in a Country Town" are among those which the practical sanitarian and the earnest layman will find most full of food for consumption and digestion. They are, in truth, especially serviceable in bringing home to the mind that the exercise of common sense in matters of hygiene may make necessary sanitation economical instead of burdensome. But the volume commences with a chapter on "The Concentration of Population in Cities." This is, of course, at first sight puzzling. But, regarded as an introduction to the succeeding themes, its insertion seems to be justified. The depopulation of our agricultural districts, with the consequent crowding and enlargement of towns and cities, is an evil, from a health point of view, which is to be deplored. The crowding of space in the outskirts of towns with rows upon rows of small houses, without gardens being attached to them, simply intensifies the evil. The practice of rural hygiene should, in some measure, be possible, not impossible, in suburban districts, and the present and future breathing spaces in and around towns need to be extended instead of restricted. As the author says, and probably only interested landholders will be inclined to cavil at his words, "Those who have the control of developing districts will do well to keep them as rural as possible, and to encourage private gardens by every means in their power. The house ought to be taxed in proportion to its size, and not the garden round it; for a garden is a great boon in a town, even to those who do not own it, because it serves to keep the dwelling-houses asunder." But this ideal state of things will never come to pass until a better public spirit prevails, and until men will be content, from patriotic or other motives, with more moderate profits on land and building transactions. There is, however, much sense and wisdom in the remark "that if the rural element be entirely banished from our towns, and if the fearful concentration of population which is seen in the modern city, both here and in America, be allowed to proceed unchecked, we are in a fair way to increase rather than decrease the liability of our towns to suffer from epidemics." This text, at any rate, is good enough, and Dr. Poore has written well from it.

"Studies in the Development of the Rabbit and the Frog." By RICHARD ASSETON, M.A. Reprinted from the *Quarterly Journal of Microscopical Science*, December, 1894.

IN this series of admirably illustrated papers Mr. Aasheton records his observations upon some very early and interesting stages of development, and he expresses opinions concerning the phenomena observed which are certainly not in accord with those generally believed. The

acceptance of his opinions will depend on the production of additional proof, but they undoubtedly deserve careful consideration and their publication should stimulate further investigations, for if his conclusions are correct, many of the phenomena of early development which we usually ascribe to inherited tendencies are due solely to internal pressure, modified by cell proliferation and external resistance. Therefore, when conditions of this kind which have been imposed upon the development in certain cases, *e.g.*, rabbit, at a comparatively recent period, produce structures apparently similar to those met with in lower forms developed under different circumstances, we are not justified in assuming that the two things are comparable, "for example, the theory that the line-like primitive streak and its groove represent the lips and aperture of an elongated ancestral gastrula mouth is impossible."

The substance of the papers divides itself readily into facts and theories; the clear exposition of the former we are bound to admire, though we may or may not agree with the latter, but the facts which Mr. Assheton has accumulated show at once the baselessness of some of our views, and they establish a knowledge of many early developmental phenomena on a much firmer foundation than has hitherto been attained, whilst at the same time his theories open up many interesting speculations and indicate the lines upon which further investigations might be conducted which may possibly lead to very valuable results.

"Index of Medicine." By SEYMOUR TAYLOR, M.D., M.R.C.P., Senior Assistant Physician to the West London Hospital. London: Smith, Elder, and Co., 1894, pp. 780.

THE object of this work is to form a medical "Companion to Keetley's 'Index of Surgery.'" In Dr. Taylor's work, however, the descriptions of the various diseases are not arranged alphabetically, but are grouped together, as in ordinary text-books, under the sections, fevers, diseases of the digestive, respiratory, circulating systems, etc.

The work is not intended to be a text-book, but only a supplement to the treatises of medicine which are generally used by medical students.

For rapid reference, a book of this kind may be useful to a student just before an examination, but we are inclined to think that he will find carefully taken notes of the systematic lectures which he attends, and of the text-books he reads, of greater service.

The descriptions of the symptoms and pathology of the various diseases is necessarily brief, and we have noticed certain loose and somewhat misleading statements. Nevertheless, the book contains a number of very useful and ingenious diagrams and tables, which will be of great value

in fixing in the student's memory the leading points in the symptomatology and pathology of the various diseases. The sections on treatment, though brief, are generally good and practical.

"Manual of Practical Morbid Anatomy; being a Handbook for the Post-mortem Room." By H. D. ROLLESTON, M.A., M.D., F.R.C.P., and A. A. KANTHACK, M.D., M.R.C.P. Cambridge: University Press, Cr. 8vo, pp. xix., 240.

"THIS handbook is an attempt to supply a practical guide to the post-mortem room," say the authors in their introduction, and any competent reader will acknowledge that they have succeeded in their attempt. They have not only supplied the student with a large amount of reliable information, but have done it in a clear and very readable form.

In the Introduction we are told that a post-mortem examination should not only be undertaken for the purpose of confirming or amending diagnosis, but also with the object of advancing our knowledge of disease. The high claims of pathology, as a science, are generally acknowledged, but are not unfrequently forgotten in the post-mortem room by the clinical observer.

In the eight chapters that follow the introduction, directions are given for the examination of the various regions and organs of the body. These directions, as well as short descriptions of the most important lesions, are very well given.

The methods recommended are more or less generally used in the London hospitals, and are all good. In the case of the brain, it might have been well to make some allusion to the advantages which serial frontal sections of the hemispheres offer.

The usual lesions found in each organ are not only indicated, but references to some of the most important effects of these lesions are here and there introduced in the shape of aphorisms such as the following, which refers to the mitral valve:—"If the edges of the valve become thickened, regurgitation may follow, but if parts of the cusps away from the edge are atheromatous, no harm is done."

In their desire to make the book useful to all, the authors have sometimes been led to give advice which indicates a certain want of confidence in the intelligence of some readers; thus, instead of giving the anatomical differences between the right and left kidney, they give the following simple directions:—"The kidneys should be examined at once after removal; if this is not convenient, each kidney should be placed on the corresponding side of the body, so that no difficulty about right or left may arise subsequently."

It is useless to say that in a work of this kind there is not much room for the introduction of original matter. The authors have done well not to attempt to suggest any radical alteration in methods which have been found to work well in practice. They have had the benefit of the traditions of two schools in which pathology has been held in honour for a considerable time, and they have had much personal experience of the wants of students in the post-mortem room. Drs. Rolleston and Kanthack have made good use of their opportunities, and have produced a book which in matter and in form does great credit to its authors.

“Modern Materia Medica.” By H. HELBING, F.C.S. Fourth enlarged Edition. London: H. K. Lewis. 1895.

THE fourth edition of Mr. Helbing's “Modern Materia Medica” is much enlarged and also improved. It now contains notices of over a thousand substances, and, like the former editions, the first part furnishes full accounts of the nature and properties of the various synthetic drugs, which have become so numerous of recent years. To these, however, have been added, in an extensive appendix, notices of many alkaloids and other active principles which have recently been prepared from vegetable drugs, also new preparations of the older remedies, and the animal extracts and antitoxines which are at present attracting so large a share of attention.

A number of useful tables are found at the end of the book, viz., a table of the doses, solubilities in water and spirit, melting and boiling points of the new remedies, another of their commercial names and corresponding chemical composition, and a tabular arrangement (from Braeutigam) of the methods of detecting certain drugs in the urine.

It is hardly necessary to consider the subject matter in greater detail. The chemical information is accurate and well arranged, the properties and tests are given very fully, and the medicinal uses briefly summarised. In the latter portion we find, as a rule, an optimistic view of the therapeutical value of the drug under consideration; in many cases there is no doubt that this will be modified by a more extended trial. A reference to the original papers, or at least to the more important of them, would greatly add to the value of the book as a work of reference.

The general get-up of the book, as regards appearance and printing, has been greatly improved since the earlier editions, and now leaves nothing to be desired. It forms the best account we have in this country of the synthetic materia medica, and while indispensable to those who have to teach the subject, can also be thoroughly recommended to all who desire to understand the chemistry and properties of the recently introduced remedial agents.

"The Year-Book of Treatment for 1895." Cassell & Co., London, Paris, and Melbourne.

THERE is no change in the appearance of this now familiar annual, which maintains this year that high standard of merit which has rendered the previous issues so popular and so generally useful. Medical men who have not the time to read a large number of original papers, and yet wish to know something of what has been done by scientific and clinical workers, cannot do better than run over its pages, and thereby obtain the information they need, and also the reference to its original source if they desire to follow up any subject in which they are particularly interested. The sections are 23 in number, and are all in the hands of capable authorities. The manner in which the sections are treated is generally uniform, but some of the writers are content to give abstracts only of the various papers, forgetting apparently that, according to the title page, the review is a "critical" one.

The new contributors are : Dr. Coupland, who takes the section on the Heart and Circulation, and includes a useful summary of the actions and uses of the various heart tonics, especially digitalis ; Professor Rose, who takes the section on General Surgery, the most noteworthy portion of which is that dealing with the surgery of the abdomen, including an illustrated account of "Murphy's Anastomosis Button" and the manner of using it ; and Dr. Whitelegge, who is responsible for the short section on Public Health and Hygiene. The remaining sections are in the same hands as last year, and contain many articles of great interest, among which probably the full account of the anti-toxin treatment of diphtheria in the section on Infectious Fevers, and the account of the use of thyroid preparations in the treatment of skin diseases, will prove particularly interesting to the majority of medical men.

The summary of the therapeutics of the year is chiefly occupied by antiseptics, antipyretics, analgesics, narcotics, and the use of organic preparations of iron.

The list of new books and new editions is an unusually long one, and concludes the book, except for the index of authors and subjects.

The editor and publishers may well be congratulated on the success with which they continue to produce this Year-Book, and especially on the uniformity of merit which they are able to attain from so large a staff of contributors.

PUBLICATIONS RECEIVED.

From J. Bale and Sons, London :—

"Difficulties of Prognosis in Insanity." By H. SUTHERLAND, M.A., M.D.

From Adlard and Son, London :—

“King’s College Hospital Reports,” Vol. I.

From J. Wright and Co., Bristol :—

“The Medical Annual, 1895.”

From H. K. Lewis, London :—

“Diseases of the Kidneys and Urinary Organs.” By Dr. PAUL FÜRBRINGER, Berlin. Translated by W. H. GILBERT, M.D.

From Baillière, Tindall and Cox, London :—

“Clinical Lectures on the Prevention of Consumption.” By W. MURRELL, M.D., F.R.C.P.

“Aids to Surgical Anatomy.” By E. S. YONGE, M.B.

“Indigestion.” By G. HERSCHELL, M.D.

Obituary.

CHARLES FREDERICK SUTTON, JUNIOR, M.R.C.S., L.R.C.P.

WITH deep regret we notice the death of Mr. C. F. Sutton, son of Mr. Sutton, surgeon, of Holmes Chapel, who died of pneumonia on February 25th, at the early age of 27. Mr. Sutton received his preliminary education at Hawthorn College, Wilmslow, and at Barton College, Worcester. He entered the Owens College in 1885, and throughout the whole of his career distinguished himself by good and steady work. In 1892, he was appointed Assistant Medical Officer at the Cheadle Convalescent Hospital, and in September of the same year to one of the House Surgeonships at the Manchester Royal Infirmary, the duties of which posts he performed with great zeal and enthusiasm. In 1893, he acted as private medical attendant to Lord Delamere, and accompanied him on a shooting expedition to South Africa, where he gave ample evidence of his skill in both medicine and surgery. Some months after his return home he joined Mr. Tinker, of Hyde, and soon became a general favourite by his genial manners and by zeal and devotion to his work. Though suffering from severe cold—the beginning of the fatal disease—he was unwilling to leave his work, till Mr. Tinker insisted upon his going to his father’s home. He subsequently developed double pneumonia, which, in spite of the incessant attention and care which his father devoted to him, terminated fatally, and cut short a young life, full of promise and hope. Mr. Sutton was

highly esteemed and beloved both by his fellow students and teachers, and his death will be much regretted by these as well as by numerous private friends.

DR. COGHLAN.

The death of William Boyle Coghlan, M.A., M.D., M.R.C.S., has caused great regret to a large circle in Manchester and the surrounding district.

He was the eldest son of Mr. William Coghlan, Firmount, County Cork, and grandson of the eminent Dr. Boyle Coghlan, of the city of Cork. He was the First Scholar of Queen's College, Cork, and was the Gold Medallist of his year at Trinity College, Dublin. After a very successful career as a student, he was ordained by the late Bishop of Hereford to the curacy of Chirbury Parish Church, Shropshire, and later was chaplain to Lord Murray Stewart, Calley, Kircudbright.

He next re-entered his old University with the object of studying medicine, and completed his course for that profession at St. Thomas's Hospital, London.

After taking a medical diploma, he commenced practice in Manchester, but though henceforth giving the bulk of his time to his new profession, he, up to a short time before his death, frequently occupied many of the pulpits of this diocese.

For many years he preached the Hospital Sunday Sermon at the Cathedral, and the medical charities of Manchester derived no small benefit from his eloquence, and from the earnestness with which he advocated their cause.

Dr. Coghlan married Helena, eldest daughter of Mr. Forbes, of Tharrington Hall, Salop, and had two children, one of whom survives him.

In his youth he was very fond of athletics, especially feats of strength, and his robust manly form, even in his later years, was well known. Up to the short sickness which proved fatal, it was his frequent boast that he had never known what it was to be ill.

His kindly, genial disposition will long be remembered, as will his prompt practical and ever-ready sympathy with all suffering, and many there are, poor as well as rich, who, by his death, have lost a true and constant friend.

GEORGE CONSTANTINE PHIPPS, M.D., F.R.C.S.E.

It is with regret that we have also to announce the death of Dr. G. C. Phipps, which occurred on February 24th, 1895, at his residence in Oxford Street.

Dr. Phipps was apparently in good health until a very short time before his death. About a month before the fatal termination of his illness he had signs of slight cardiac failure, and a week before his death was seized with symptoms of pulmonary embolism.

Dr. Phipps was the son of Mr. Michael William Phipps, solicitor, of Passage West, Cork. He received his medical education at Edinburgh, and qualified in 1862. In 1870 he married a daughter of the Rev. Charles Robert Gayer, Vicar of Ventry and Dunure, Kerry. Three of his sons are entering the medical profession.

Dr. Phipps had been in practice for many years in Manchester, and by his genial and unassuming manner and kindness of disposition had gained the highest respect and esteem of all who knew him.

Local News.

POST-GRADUATE CLASSES IN MANCHESTER.

THE post-graduate classes which have been conducted for many years at the Owens College will be continued in the coming summer session. Lectures and demonstrations will be given in June and July, commencing on Monday, June 10. Particulars of the classes will be forwarded on application to the Registrar.

H. B. POLLARD, B.A. (Oxon.), D.Sc. (Lond.), Bishop Berkeley Fellow in Zoology at the Owens College, has been appointed Lecturer on Biology at the Medical School of Charing Cross Hospital, London.

VICTORIA UNIVERSITY.

RESULTS OF EXAMINATIONS—FACULTY OF MEDICINE.

MARCH, 1895.

M.B. AND CH.B. EXAMINATION.

FINAL

AINSWORTH, HUGH (Owens).
 ASHE, C. S. (Owens).
 BICKERTON, R. E. (Univ.).
 DARBYSHIRE, D. E. (Univ.).
 FISH, F. W. (Owens).
 HALL, J. P. (Owens).

HOLT, J. J. H. (Owens).
 NEWALL, W. A. (Owens).
 SCOTT, H. A. (Owens).
 SPINK, W. L. (Yorks.).
 TAGGART, J. S. (Owens).

PART I.

BOWMAN, G.F. (Owens).	MOORE, F. C. (Owens).
BRUSHFIELD, ARCHIBALD (Owens).	SHAW, J. V. (Yorks.).
CALLUM, H.S.H. (Yorks.).	THORP, SPENCER (Owens).
LIGERTWOOD, C. E. (Yorks.).	TROTTER, R. H. (Yorks.).

HONOURS—First Class—were awarded to HUGH AINSWORTH (Owens), and J. S. TAGGART (Owens).—Second Class—J. P. HALL (Owens).

SECOND M.B. AND CH.B. EXAMINATION.

A.—ANATOMY AND PHYSIOLOGY.

AULD, J. T. (Owens).	MASON, J. H. (Yorks.).
AUNGIER, MARK (Univ.).	MAWDSLEY, H. A. (Univ.).
BAMFORD, T. F. (Owens).	MELLING, W. T. (Owens).
BATEMAN, W. H. (Owens).	MILNE, JOHN (Owens).
BRADLEY, WILLIAM (Owens).	MONK, H. G. H. (Yorks.).
BUTTERWORTH, J. J. (Owens).	MOONEY, JOHN (Owens).
CROMPTON, H. J. (Owens).	MOORHOUSE, C. H. (Yorks.).
DELECOURT, L. O. (Owens).	PRESTWICH, JOHN (Owens).
DUTTON, J. E. (Univ.).	PRIESTLEY, A. H. (Owens).
GRAHAM, WALTER (Univ.).	RENSHAW, GRAHAM (Owens).
GRIFFITH, A. S. (Univ.).	SHELDON, J. H. (Owens).
HARTLEY, HAROLD (Owens).	SUTHERLAND, ROBERT (Univ.).
HODGSON, J. F. (Owens).	THORP, HAROLD (Owens).
HURTER, D. G. (Univ.).	WHITWAM, L. S. (Univ.).
KELSALL, ROBERT (Owens).	WILLETT, J. H. (Univ.).
KEMP, JAMES (Owens).	WILLIAMSON, JOSHUA (Yorks.).
LAWSON, G. G. L. (Univ.).	WYLIE, D. S. (Owens).
LOVEGROVE, F. T. A. (Univ.).	

MATERIA MEDICA AND PHARMACY.

ASHTON, D. A. (Owens).	HICKEY, WALTER (Owens).
AULD, J. T. (Owens).	HURTER, D. G. (Univ.).
BAMFORD, T. F. (Owens).	KELSALL, ROBERT (Owens).
BOLLANS, R. W. (Yorks.).	LAWSON, G. G. L. (Univ.).
BRIDGE, H. N. (Owens).	MARTIN, E. J. (Owens).
BUCKLEY, LUCY (Univ.).	O'NEILL, THOMAS (Owens).
BYTHELL, W. J. S. (Owens).	PRIESTLEY, A. H. (Owens).
CLARKE, H. R. (Owens).	SCHOFIELD, C. R. (Owens).
DARLOW, FRANCIS (Yorks.).	SHELDON, J. H. (Owens).
DEARDEN, J. W. (Yorks.).	SLATER, HARRY (Owens).
GRAHAM, WALTER (Univ.).	SUTHERLAND, ROBERT (Univ.).
HAMER, ROLAND (Owens).	VEALE, H. de P. B. (Yorks.).
HART, T. W. (Owens).	WATSON, J. V. (Owens).
HARTLEY, HAROLD (Owens).	WRIGHT, WILLIAM (Owens).

THE SCHOLARSHIP in Medicine, value £50, awarded on the results of the Second M.B. and Ch.B. Examination, was gained by ROBERT KELSALL (Owens).

HOSPITAL EXTENSION IN MANCHESTER.

The question of increasing the general hospital accommodation in Manchester, which was so fully discussed some four years ago, has been re-opened within the last few weeks. The necessity of providing additional accommodation has been evident for many years, but as yet there seems no unanimity of opinion as to the locality where such should be provided.

The Board of Management of the Royal Infirmary are of opinion that an enlargement of the present building should be made. This they consider could be most satisfactorily accomplished by elongating the Infirmary at each end, failing this, they are in favour of raising the whole structure by one storey, and making other less important additions to the building.

Neither of these plans, however, has been sanctioned by the Trustees. As an alternative, it is proposed that the Infirmary should be entirely rebuilt on the present site. Against this it is held that if a new building is erected in conformity with "the requirements of modern sanitary science," no addition can be made to the present number of beds, at least without encroaching upon the vacant space now existing. A further proposal is "to retain the present building as the Infirmary headquarters, but to find in the suburbs, far from the noise of the city, the additional accommodation that is required," and in particular, reference is made to the site on the Stanley Grove estate, formerly offered for this purpose by the Council of the Owens College.

UNIVERSITY COLLEGE, LIVERPOOL.

PROFESSOR FRANCIS GOTCH has been appointed to the Waynflete Chair of Physiology at Oxford, in succession to Professor Burdon Sanderson, who has been elected Regius Professor of Medicine. Prior to his appointment to the Holt Chair of Physiology in University College, Liverpool, Professor Gotch was Lecturer on Physiology at Oxford, and Demonstrator in the Physiological Laboratory. His return to Oxford will be a loss both to the Liverpool school and to the Victoria University.

Notice.

IN addition to papers by members of the medical profession in Manchester, which will appear in the **MEDICAL CHRONICLE** during the year, the Editorial Committee have received promises of original contributions from the following :—

- W. MITCHELL BANKS, M.D., F.R.C.S.,** Surgeon, Royal Infirmary, and late Professor of Anatomy, University College, Liverpool.
- T. LAUDER BRUNTON, M.D., D.Sc., F.R.C.P., F.R.S.,** Lecturer on *Materia Medica* and Therapeutics, St. Bartholomew's Hospital, London.
- W. WATSON CHEYNE, M.B., F.R.C.S., F.R.S.,** Professor of Surgery, King's College, London.
- SYDNEY COUPLAND, M.D., F.R.C.P.,** Physician, Middlesex Hospital, London.
- C. J. CULLINGWORTH, M.D., F.R.C.P.,** Lecturer on Midwifery, St. Thomas's Hospital, London.
- W. HOWSHIP DICKINSON, M.D., F.R.C.P.,** Consulting Physician, St. George's Hospital, London.
- W. R. GOWERS, M.D., F.R.C.P., F.R.S.,** Consulting Physician, University College Hospital, London.
- D. J. HAMILTON, M.B., F.R.C.S. (Edin.),** Professor of Pathology, University of Aberdeen.
- VAUGHAN HARLEY, M.D., M.R.C.P.,** Grocers Research Scholar, University College, London.
- BERRY HART, M.D., F.R.C.P. (Edin.),** Lecturer on Midwifery, Edinburgh.
- VICTOR HORSLEY, M.B., F.R.C.S., F.R.S.,** Professor of Pathology, and Surgeon, University College, London.
- A. A. KANTHACK, B.A., M.D., F.R.C.S.,** Lecturer on Pathology, St. Bartholomew's Hospital, London.
- E. KLEIN, M.D., F.R.S.,** Lecturer on Physiology and Bacteriology, St. Bartholomew's Hospital, London.
- P. MacBRIDE, M.D., F.R.C.P.,** Lecturer on Diseases of the Ear and Throat, Edinburgh.
- G. VIVIAN POORE, M.D., F.R.C.P.,** Professor of Medical Jurisprudence and Clinical Medicine, University College, London.
- H. D. ROLLESTON, M.A., M.D., F.R.C.P.,** Lecturer on Pathology, St. George's Hospital, London.
- FELIX SEMON, M.D., F.R.C.P.,** Physician for Diseases of the Throat, St. Thomas's Hospital, London.
- RALPH STOCKMAN, M.D., F.R.C.P. (Edin.),** Lecturer on *Materia Medica* and Therapeutics, Edinburgh.
- E. F. TREVELYAN, M.D., B.Sc.,** Professor of Pathology, Yorkshire College, Leeds.
- W. HALE WHITE, M.D., F.R.C.P.,** Lecturer on *Materia Medica* and Physician, Guy's Hospital, London.
- G. S. WOODHEAD, M.D., F.R.C.P. (Edin.),** Director of the Research Laboratory of the Conjoint Board, London.

THE MEDICAL CHRONICLE:

A MONTHLY RECORD OF THE

Progress of Medical Science.



ON SOME VULGAR ERRORS IN CHIRURGERY.

By W. MITCHELL BANKS, F.R.C.S., &c.

Surgeon, Liverpool Royal Infirmary; Emeritus Professor of Anatomy, University College
Liverpool.

I TRUST that those who may chance to read this little paper will not consider that I am using the word "vulgar" as in any way synonymous with low or mean. I am using it in the old sense, which simply meant "popular"—the thing that was common with the *vulgus* or general public. I have been led into using this title because I have long been infinitely delighted with an old book, termed, "Pseudodoxia Epidemica; or Enquiries into very many received Tenents and commonly presumed Truths." This is known to the book hunter as "Browne's Vulgar Errors." In the middle of the seventeenth century, in the city of Norwich, lived the famous physician Sir Thomas Browne, known to all of us as the writer of that charming book the "Religio Medici"—a book remarkable, considering its day, for its liberality, its breadth of thought, and its humanitarianism. His name is so associated with this book that it has completely overshadowed all else that he wrote, and, consequently, his "Vulgar Errors" are only known to those who collect old medical books—which is not a very expensive, and is, at the same time, a vastly entertaining, amusement. I possess a copy of the "Pseudodoxia Epidemica," with the date 1646. The introduction is very amusing. He asks some leniency from his readers, seeing that he is a medical man in practice: "Some consideration we hope from the course of our Profession, which, though it leadeth us into many truths that passe undiscovered by others, yet doth it disturb their communications and much"

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"interrupteth the office of our pens in their well intended transmissions ;"
 "and, therefore, surely in this worke attempts will exceed performances ;"
 "it being composed by snatches of time, as medicall vocations and the"
 "fruitless importunity of Vroscopy would permit us. And therefore also"
 "perhaps it hath not found that regular and constant stile, those infallible"
 "experimenta, and those assured determinations, which the subject some-"
 "time requireth, and which might be expected from others whose quiet"
 "doors and unmolested hours afford no such distractions. Although, he"
 "who shall indifferently perpend the exceeding difficulty, which either"
 "the obscurity of the subject or unavoidable paradoxologie must often"
 "put upon the Attemptor, will easily discern that a work of this nature"
 "is not to bee performed on one leg and should smell of oyle if duly and"
 "deservedly handled." From this we see that, even in Norwich 250 years
 ago, the leading physician was not a little harassed. One cannot help
 wondering how it would fare with him if we could catch him and put
 him into a modern consulting room, with the telegraph boy or the
 printer's devil waiting in the hall, and the telephone driving him frantic
 with its hideous jangling. I suspect he would be glad to take himself
 off to his study in the quiet city of Norwich, and resume with a grate-
 ful heart his "medicall vocations and the fruitless importunity of
 Vroscopy."

A great charm about Sir Thomas Browne is his modesty. Really
 clever and able things that are modestly put live the longest. Hence it
 is that his "Religio Medici" has taken such a strong hold upon people.
 With our modern ideas of liberality and freedom of thought, its tenets
 are the simplest of the simple, but they are given forth as from a gentle-
 man who was both courageous and modest. In his preface to the
 "Pseudodoxia," he says : "Lastly, wee are not Magisteriall in opinions,"
 "nor have wee Dictator-like obtruded our conceptions, but, in the humility"
 "of Enquiries or disquisitions, have only proposed them into more ocular"
 "discerners. And, therefore, opinions are free ;—and open it is for any to"
 "thinke or declare the contrary. And wee shall so farre encourage contra-"
 "diction, as to promise no disturbance or reoppose any Penne that shall"
 "Elenchically refute us, that shall only lay hold of our lapses or single"
 "out digressions, corollaries, or ornamental conceptions in which to"
 "evidence his own as in different truths. And shall only take notice of"
 "such, whose experimental and judicious knowledge shall solemnly look"
 "upon it, not onely to destroy of ours, but to establish of his owne ;—not"
 "to traduce or extenuate, but to explain and delucidate, to adde and"
 "ampliate, according to the laudable custom of the Ancients in their"
 "sober promotion of learning."

The work is divided into seven books or chapters, of which the first
 is general in its nature : "Of the first cause of common Errours, the

common infirmity of humane nature." The second book begins the "particular part concerning Minerall and vegetable bodies." The third book is of popular and received Tenents concerning animals; the fourth book of many popular and received Tenents concerning man; the fifth, of many things questionable as they are described in pictures of popular customs, opinions, practises, and observations; the sixth, concerning sundry Tenents geographically and historically; and the seventh, concerning many historical Tenents generally received and some deduced from the history of holy Scripture. In short, this is the first book which dealt a decided blow at popular superstitions and ridiculous beliefs, which had no true foundation in fact. When one considers that two centuries and a half have elapsed since Browne wrote, it is appalling and almost incredible to think that very recently some half dozen people have been committed to prison on a charge of roasting a woman to death because she was a witch, one of the prisoners being the woman's husband!

Let us glance at some of the "Tenents" which he discusses—

That a diamond be made soft, or broke by the blood of a goat.

That a pot full of ashes will containe as much water as it would without them.

That the root of mandrakes resembleth the shape of man; that they naturally grow under Gallows and places of execution; that the roote gives a shreeke upon eradication; that it is fatall or dangerous to dig them up.

His attack upon the last tenent concerning the mandrakes is admirable. "The last concerneth the danger ensuing, that there followes "an hazard of life to them that pull it up, that some evill fate pursues" "them and that they live not very long after. Therefore the attempt" "hereof among the ancients was not in the ordinary way, but, as Pliny" "informeth, when they intended to take up the root of this plant, they" "tooke the wind thereof and, with a sword describing three circles about" "it, they digged it up, looking towards the West; a conceit not only" "adjurious unto truth and confutable by daily experience, but somewhat" "derogatory unto the providence of God, that is not only to impose so" "destructive a quality on any plant, but conceive a vegetable whose parts" "are useful unto many should in the only taking up prove mortall unto" "any. To think he suffereth the poyson of Nubia to be gathered," "Napellus, Aconite, and Thora to be eradicated, yet this not to be moved." "That hee permitteth Arseniok and minerall poysons to be forced from" "the bowells of the earth, yet not this from the surface thereof. This" "were to introduce a second forbidden fruit, and inhance the first malediction; making it not only mortall for Adam to taste the one, but" "capitall unto his posterity to eradicate or dig up the others."

That an elephant hath no joynts.

That a Bever to escape the hunter biteth off his testicles or stones.

That a Badger hath the legs of one side shorter than of the other.

That a Beare bringeth forth her cubs informous or unshaped.

That a Wolfe first seeing a man begets a dumbnesse in him.

That a King's fisher hanged by the bill sheweth where the wind is.

Of the pissing of Toads, of the stone in their head and of the generation of frogs.

Of the Amphisbœna or serpent with two heads moving either way.

That a Salamander lives in the fire.

That Storkes will onely live in Republicks and free states.

• Sir Thomas enquires into the venomous powers of the Basilisk.

"According to the doctrine of the Ancients, men still affirm that it"
 "killeth at a distance, that it poysoneth by the eye, and that by"
 "priority of vision. Now that deleterious it may bee at some distance"
 "and destructive without a corporal contaaction, what uncertainty"
 "soever there be in the effect, there is no high improbability in the"
 "relation. For if plagues or pestilentiall Atoms have been conveyed in"
 "the ayre from different Regions, if men at a distance have infected"
 "each other, if the shaddowes of some bees be noxious, if Torpedoes"
 "deliver their opium at a distance and stupefie beyond themselves, we"
 "cannot reasonably deny, that, beside our grosse and restrained poysons"
 "requiring contiguity unto their actions, there may proceed from sub-"
 "tiler seeds more agile emanations, which will contemne those laws"
 "and invade at a distance unexpected."

His naturally religious bent crops out in some observations about the belief that a man became hoarse or dumb if a wolf had the advantage first to eye him. "The ground or occasional original hereof was probably the amazement and sudden silence the unexpected appearance of wolves do put upon travellers;—not by a supposed vapour or venomous emanation, but a vehement fear which naturally produceth obmutescence and sometimes irrecoverable silence. Thus birds are silent in presence of an Hawk, and Plinie saith that dogs are mute in the shadow of an Hyæna. But thus could not the spirit of worthy Martyrs be silenced, who, being exposed not onely unto the eyes but the merciless teeth of Wolves, gave loud expression of their faith and their holy clamours were heard as high as heaven."

But our author did not confine himself to mere argument. All through the book mention is made of dissections made to disprove such notions as that horses and pigeons have no gall, and of experiments of a very simple but effectual kind. As an example of the latter see his refutation of the statement that a dried kingfisher hung up by the beak showed which way the wind blew. "As" "for experiment we cannot make it out by any we have attempted," "for, if a single kingfisher be hanged up with untwisted silk in an open" "room where the ayre is free, it observes not a constant respect unto" "the mouth of the wind, but, variously converting, doth seldome breast" "it right. If two be suspended in the same room, they will not regularly conforme their breasts, but oft-times respect the opposite points" "of heaven. And, if we conceive that for the exact exploration they" "should be suspended where the ayre is quiet and unmoved, that, clear" "of impediments, they may more freely convert upon their naturall" "verticity, we have also made this way of inquisition in suspending" "them in large and capacious glasses closely stopped, wherein, never" "theless, we observed a casual station, and that they rested irregularly" "upon conversion; wheresoever they rested remaining inconverted and" "possessing one point of the Compasse, whilst the wind perhaps hath" "passed the two and thirty."

As this journal is not intended for youths and maidens I may be forgiven for a final quotation. Sir Thomas has been discoursing of the nature of Unicornes and of the recognised pictures and descriptions of them, and then he comes to the Royal Arms. "We are unwilling to" "question the Royall supporters of England, that is the approved" "descriptions of the Lion and the Unicorne, although, if in the Lion" "the position of the pizell be proper and that the naturall situation," "it will be hard to make out their retrocopulation or their coupling" "and pissing backward according to the determination of Aristotle; all" "that urine backward do copulate *clunatim* or aversely, as Lions, Hares," "Linxes." It is most funny to note the apology for his attack upon the British Lion, and at the same time the solemn duty imposed upon him by science to protest against the heraldic misrepresentation of the private parts of that noble retromingent.

Following the manner of Sir Thomas I would propound a Tenent.

Of the Bending of Joyntes.—It is not so long ago since the treatment of disease of the joints by complete and absolute rest was practically unknown. It is true that there were splints, but the rest to the joint given by them was quite inefficient, and there was, moreover, no real sound faith in it. Men hankered after inunctions and lotions and blisters. Hilton's book on Pain and Rest and the invention by Thomas

of his knee and hip splints, turned the tide; and for many years back medical men have become profoundly impressed with the doctrine that all bad joints must be rigidly fixed and must be kept so for very long periods. Now let us take the instance of a severe wrench of the knee joint. The patient is probably in bed for a week, having the "fire" taken out of the joint by means of fomentations and soothing local applications. Then he is put on a Thomas' splint, and the knee kept rigid until such time as the fluid has all disappeared from the joint, and the articulation seems quite natural. Then the doctor says that the splint may be taken off, and that the patient must begin gently to use the knee. To his surprise he is summoned after the lapse of two or three days by the patient, who tells him that after making a gentle trial of the limb the old pain has come back in the knee, and the fluid has returned also. Condolences are given, but the patient is assured that, since there is pain and re-accumulation of fluid, it is evident that the cure had not been complete, and the splint must be replaced. Again the fluid disappears, and everything appears natural once more, and again the process of attempting to bend the knee and use it gently is followed by a return of the pain and swelling. At this juncture, however, the patient's friends intervene and implore him to be off to see Mr. So-and-so, the great joint doctor, either quack or registered—or both. Now from all time the remedy has been one and the same—simply a complete and thorough bending of the joint. Naturally a crunching sound occurs as the adhesions break down, and the rigid fasciæ are stretched, and the rusty tendons move in their sheaths—just like what occurs to the engines of some big steamer that has been for months laid up useless in dock, when first her fires are lighted again and the rusty wheels and pistons creak and groan in their unwonted movements. The old-fashioned "bonesetter" used unblushingly to aver that the sounds audible on bending the joint indicated the return to their places of mysterious small bones whose dislocation the regular doctor had failed to take note of, and sent his patient off home. His modern successor only talks blandly of the extreme ignorance of general practitioners upon special subjects, but he keeps the patient under courses of skilled massage, and gently-tempered galvanism and very precious and special gymnastic movements to be conducted under his own eye. The latter is certainly much the more artistic method, and much the more remunerative also. The patient, having returned home, never loses an opportunity for the rest of his natural life of telling his friends how his own family doctor made a complete mess of his case, and how the eminent joint specialist made him quite well again in no time without any splints at all. The worst of this is that it is unfortunately too true. However the general practitioner may writhe under his failure and try to explain it away, neither

patient nor public will believe him. The moral is that he must anticipate the heaven-born bonesetter or the eminent joint specialist. But how! By plucking up courage and learning to know that there comes a time when rest and splinting are not only no longer useful, but are positively detrimental. He must turn the key in the rusty lock vigorously backwards and forwards, and then only will it work sweetly. The difficulty is always to determine when the turning has to be done. The chief signs are absence of all heat in the joint (most important sign), departure of fluid from the interior, thinning of the joint, and re-appearance of its natural hollows and folds. Then chloroform should be given, the joint completely doubled up and well waggled about and packed in ice for twenty-four hours. I would go even further and say that, if even a certain amount of thick jelly-like fluid be in the joint, the forcible bending will be the first thing to dispel it, provided only the joint be quite cool. It is true that in former days some dreadful accidents occurred in the hands of the bonesetters, who, by forcibly moving joints which were still in a state of subacute inflammation, lit up the old disease with such intensity that legs and even lives were lost. But no well educated doctor would do this—he errs entirely in the opposite direction, and, having all but cured his patient, just fails at the finishing touches and gets nothing but ousers for his pains. *Fas est ab hoste doceri.*

That Pain is a Sign of Cancer.—Pain is generally regarded as so terrible and unmitigated an evil that we sometimes forget that it has many advantages. It is the stormy petrel that warns us of coming evil. But pain is seldom commensurate with the amount of disease with which it is associated. A toothache or a grain of sand in the eye will occasion an amazing amount of suffering, while a man may be dying from a deadly cancer and have practically no pain at all. Somehow or another there is a belief, which is universal among the public, and which still has a hold upon members of our profession, that pain and cancer go together. Now this is not an invariable truth, even in cases where the disease goes through all its stages to the end. There are many cases of brain cancer, and of cancer of the viscera, where at no time is pain a prominent symptom, and where the patients simply wither away. But while this absence of pain is often noticed all through in cases which prove fatal after a considerable time, it is invariably true of cancer in its early stages. There is no pain then, and this it is which often proves so deceptive and so destructive to the patient. I have made particular enquiry into this point in a very large number of cases of cancer of the breast, and have found that in the majority the patient was unaware that there was any lump in the breast at all, and only discovered it by accident. Women discover it very frequently while in the process of washing. It is the absence of pain that produces the fatal security, for

they have been brought up to believe that with cancer there is always agonising pain, and as they have no pain whatever in their lumps they argue that these cannot possibly be cancerous. And so months of inestimable value pass by. But it is not by the public alone that this view is shared. I have been astonished how many medical men have brought up the absence of pain in some doubtful tumour in its early stages as an argument against its being malignant.

That Cachexia is a Sign of Cancer.—This "Tenent" runs on all fours with the preceding one. It is true, and it is not true. It is true of cancer in its late stages, and it is not true of cancer in its earlier ones. So that the absence of cachexia, like the absence of pain, must not be taken at all into account in making a diagnosis of a suspicious neoplasm in its early condition. Here again the poor patients and their friends console themselves with the idea that their maladies cannot be of a cancerous nature, because they look so well and hearty. I have often had patients come with early malignant disease, particularly in the breast, who declared they never felt better in their lives. Cachexia is essentially a late sign. It is the product of intense mental distress, of agonising pain, of loss of sleep, and of auto-infection from septic discharges from the malignant growth. By the time genuine cachexia has appeared there will be no doubt in the mind of the veriest tyro as to the nature of the growth. It is, therefore, useless as a diagnostic symptom except in one instance. Suppose a hale, hearty, fresh-coloured man about sixty, with "fair round belly with good capon lined." Without apparent cause he begins to shrink somewhat; he gets pale and has no appetite either for work or food, but is listless and nerveless. You find his heart sound, and no albuminuria nor sugar present. Suspect abdominal cancer, most likely of the bowel. There may be a considerable growth, but as it has had room to expand, it has caused no pain, while it has not excited alarm by constricting the gut.

When a patient is dying in a cachectic state his appearance naturally produces a vivid impression on those who see him, and they unconsciously associate his appearance with cancer. Hence a very little extension of this idea produces the notion that it is poor, sickly-looking persons who are prone to the disease. Nothing can be more erroneous. It is the well-nourished, robust, often powerful people who suffer. I have known many victims of tongue cancer who were quite remarkable for their splendid physique and hardy, vigorous constitutions. Moreover the younger and more vigorous and "juicy" the patient, the more rapid and fatal are the ravages of the disease. The undoubted increase of cancer in England seems to be co-existent with a diminution in the mortality from phthisis. This would point to a generally improved state of nutrition on the part of the people at large, and of this there

cannot be a doubt. The food, the clothing, and the homes of the working and lower middle classes have improved amazingly. They have more food, and that of a better quality, and notably flesh meat enters into their diet to such an extent that people who only got a chance of eating it once a week half a century ago now eat it every day. It is true that De Haviland's charts indicate certain localities as favourite strongholds of cancer, but I am every year more and more convinced that too highly nourished bodies are dangerously liable to cancer, and that something may yet come out of our recognition of this fact in the way of treatment.

Of Heredity in Cancer.—This is rather a difficult question to deal with. Barring accidents and surgical diseases, which have nothing to do with diathesis, men may be said to have constitutions which bear the stamp of syphilis, of tubercle, of rheumatism, of gout, and of cancer. The bulk of mankind die of the products of these diatheses. It cannot, therefore, be surprising that a certain amount of inherited tendency should be found in cancerous patients, but I believe that the popular view as to the amount of this is very much exaggerated. Every now and then one falls upon a family where relative after relative has died from cancer, and the history of such a family strikes us sharply. But I have made careful inquiry during the last fifteen years into the history of a very large number of persons with scirrhus mammae, and have been surprised to find how few of them have been able to make out a case of heredity. In a large family with numerous uncles and aunts one must expect to find some one who has died from cancer. You will probably find many who have died from tubercular, or gouty, or rheumatic, or (if you could discover it) syphilitic mischief, but this fact is not so striking as a death from cancer, and thus it has come to pass that an amount of importance has been attached to heredity in this disease, which my experience has not by any means confirmed, but quite the reverse.

In considering the case of a female with a suspicious, but ill-defined, breast tumour I have often heard her doctor say: "Well, but the patient" "hasn't the faintest twinge of pain, she looks as well and hearty as ever" "I saw her look in my long acquaintance with her, and I have carefully" "enquired into the family history and cannot find a single relative who" "died from cancer. Surely, under these circumstances, this cannot be a" "malignant tumour!" I am always sorry to have to say that these are mere negative proofs, and are worth absolutely nothing as proving that the tumour is an innocent one. The converse—pain, cachexia, and proved heredity—are positive proofs, and strengthen the diagnosis in favour of malignancy.

Of the Uselessness of Tincture of Iodine outwardly applied.—It is an admitted fact that nothing in the whole range of medicine is so difficult

to determine as the value of a drug. It is amazing how some men believe in drugs, and at the present moment the ruling personage in medicine is certainly a druggist. He writes books and keeps magazines expressly for the purpose of puffing his tabloids, alkaloids, peptonoids, elixoids, colloids, jelloids, bi-palatinoids, and other "oids" too numerous to mention. And there are even physicians who positively pander to this drug mania, and whose secret of success lies in always being ready to prescribe the latest novel remedy from New York even in the most hopeless cases. Of course, the unfortunate family doctor, having come to the end of his tether, is only too glad to have something to go on with which has not been tried before, while the patient catches at that straw, the new drug, as having latent possibilities which may yet float him to the haven of health. But this sort of thing is neither the art nor the science of medicine. It is only the jugglery thereof. The real value of a drug can be found in two ways: First, by a most careful and elaborate series of protracted experiments, and secondly by the long experience of a man of observation and of a judicial turn of mind. Many men are so sanguine that they jump at anything new, and persuade themselves that it is a very wonderful remedy, until a newer "oid" appears. Whenever a man tells me about a drug which "works like a charm" I begin to have doubts about his good judgment. Well, I do not set up in any way as a person of extra intelligence and acumen, but I dare say I have an average share of common sense, and having seen a very great number of persons painted with tincture of iodine I cannot say that, from a surgical point of view, I have seen them benefited thereby. Having been taught to paint certain parts of the body with tincture of iodine, I believed what my teachers told me as to its good effects, and coloured many patients' necks and knees a beautiful rich brown. I confess I like the colour. There is a fine warmth about it which is attractive. I don't believe it would have been half so popular if it had been green or blue; but the deep dark brown has a certain practical air of efficiency about it which makes you think that it really must do something. Probably iodine painting is chiefly made use of in swollen glands of the neck. Now, I do not believe it does one atom of good. If the glands have become caseous its inutility must be obvious to any one who has ever cleared a neck out from these glands. If the glands are only inflamed from cold or tooth or throat irritation, then it is worse than useless: it only tends to make them suppurate. Inflamed glands should be soothed, not irritated. Tubercular glands should be excised or scraped out. If the patient positively must have some local application made, the iodide of lead ointment may be very gently rubbed on. It is harmless, and its colour is a beautiful yellow, nearly as attractive as that of the tincture of iodine. The knee-joints

and elbow-joints are probably the parts next most affected by the artist in brown. There the results are often disastrous, because this miserable sham is the reason whereby much valuable time is lost before the application of a splint is resorted to. One fortnight of well applied rest in the early stage of joint trouble may save many months of suffering. This fortnight is too often lost in iodine daubing. To my mind, this treatment is one of the most superstitious and vulgar of errors.

That Constipation is a sign of Malignant Stricture of the Rectum.—This is a very natural error, because constipation is distinctly the sign *par excellence* of non-malignant stricture. This latter condition, for reasons not yet clearly understood, is almost entirely confined to women. It is often syphilitic in origin, but in many cases all that can be felt is a thing like a membranous diaphragm with a hole in it. Now here there is genuine constipation from partial obstruction, only relieved by constant enemata. But in the early stages of cancer there is no obstruction. The growth irritates—that is all. The patient wants to go more frequently to stool. But, as matters get worse, a certain closure does occur. The solid fecal mass comes down to the narrowed point and cannot pass. The bowel turns it round and round and champs it up, and sheds mucus over it. So it is thinned, and some is squeezed through and produces a call. The patient goes to the closet and relieves himself. But he has hardly got back to his room when the call is felt again, and this may occur three or four times, with much straining and a vivid sensation of want of satisfaction. At last the bowel gets emptied, and the patient frequently has peace for the rest of the day and night. So that often the earliest sign of rectal cancer is diarrhoea, and certainly not constipation. This diarrhoea, however, differs from the simple chronic diarrhoea in this, that the goings to stool in the latter may extend over the whole twenty-four hours, whereas in the early stages of cancer the diarrhoea is usually in the morning, when the bowels are naturally moved, and is simply due to the fact that the gut has to be emptied at several sittings in place of one. At a later stage there is desire to go to stool at any time of the day or night, but this is not due to the passing of feces, but because the rectum below the cancer gets filled by an ounce or two of acrid, sanious discharge from the non-ulcerating growth. The smell of this is usually horrible, and sometimes a smart hæmorrhage comes with it. The moral of this is, that if a practitioner has a middle-aged patient who gets the kind of diarrhoea just described—or, indeed, any diarrhoea where the amount passed at one time is small—he ought to examine the rectum with great care.

On Dangers in the use of Nitrate of Silver.—With regard to the local use of nitrate of silver, I think that, like tincture of iodine, there is nothing it does that cannot be done as well, or better, by other drugs.

But any evils that attend on the use of iodine are negative, being chiefly the loss of valuable time in the early stages of joint disease, whereas there are evils of a seriously active character which follow the mischievous employment of lunar caustic. These are practically confined to its application to the mucous membrane of the tongue, cheeks, and lips. On going into a hospital out-patient room you will often see a burly, red-faced, greyish-haired man, with a big muffler up to his nose, and a bit of cotton wadding in one ear. He has cancer of the tongue. He tells you that something like a little blister came on the side of it, that it would not get well, and that he went to his doctor, who has been touching it with caustic every second day for the last month. When you open his mouth you find an epitheliomatous sore, which has been started by the sharp edge of a tooth, which has never been removed, and which has been irritated into malignancy by the use of caustic. I could tell many tales—as every surgeon of experience can—of the dreadful fate which has overtaken many a poor fellow from the well-intentioned, but fatal, persistence of doctor or chemist in worrying into a cancer some trifling ulcer, which the removal of a tooth and a snick with a pair of curved scissors would have cured. In men over forty all sores on the mouth or on the lips are practically either syphilitic or cancerous, and to neither of these can the use of caustic do anything but harm. I make a point of warning students never to put caustic near the mouth or lips, for I believe it has led many men to a terrible death, so that, for all the good it does, it would have been better if it had never been invented.

THE VALUE OF SERUM TREATMENT IN TETANUS.*

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BEFORE estimating the value of any treatment, we must be acquainted with the percentage of recoveries amongst cases either not treated at all or treated by more or less indifferent or non-specific methods. In former years, it appears the prognosis in all cases of tetanus was considered to be extremely grave and serious. It is a matter of great difficulty to form an approximately correct estimate of the tetanus mortality, because

* See MEDICAL CHRONICLE, 1898.

a limited number of cases are reported in the journals, and generally only the successful ones, and an equally limited number of cases find their way into the hospitals.

Authorities differ greatly in their estimates. The hospital percentage of deaths is estimated by Behring at from 80 to 90 per cent, while, according to Albertoni, it is only 21 per cent, and according to Sormanni 44 per cent. Behring's figure is evidently too high; Roux and Vailard are, perhaps, more correct in calculating it at 50 per cent. Now, in all such calculations, the cases are arranged without any particular *fundamentum divisionis*, and that is a serious matter in the question under discussion. For it appears that the severity of the disease and the seriousness of its prognosis in tetanus depends, *inter alia*, on the rapidity of the onset, the acuteness of the case, and the period of incubation, *i.e.*, generally speaking, the shorter the incubation period is, the more serious the outlook.

Thus, according to Richter :—

Of 25 cases, with an incubation period of 1 to 5 days, 96·0 per cent died.

„ 91	„	„	„	6	„	10	„	95·6	„
„ 54	„	„	„	11	„	15	„	73·0	„
„ 20	„	„	„	15	„	20	„	55·0	„
„ 15	„	„	„	over 20 days				80·0	„

Poland gives similar statistics, thus :—

Of 25 cases, with an incubation period of 1 to 5 days, 96·0 per cent died.

„ 61	„	„	„	1	„	10	„	96·7	„
„ 44	„	„	„	10	„	22	„	75·0	„
„ 6	„	„	„	over 22 days				50·0	„

Richter further states that of 717 cases of tetanus acquired on the battlefield, 80 per cent died. Marcosignori, on the other hand, collected 188 cases from the journals—cases treated by all sorts of methods, excepting the antitoxine method—and finds a mortality of only 25 per cent, while Albertoni collected 176 cases, with 37 deaths, or a mortality of 21 per cent. Sormanni prepared statistics from cases treated in Italian hospitals during the years 1882, 1883, and 1884, and obtained a mortality of 40 per cent. Gowers estimates it, for traumatic tetanus, at 90 per cent, and Dean, analysing the cases admitted to the London hospitals during 16 years, at 80 per cent.

We see, then, that it is almost impossible to come to any definite conclusion as to the actual rate of mortality in tetanus before the days of antitoxine, and fresh statistical data, properly arranged and classified, are sadly wanted. On analysing the cases and figures, so far as I have been able to collect them, it was found that the more chronic and milder cases, *i.e.*, those of a prolonged incubation period, of a slow onset, and

with localised spasms, frequently, if not generally, survive, and that acute cases, where the incubation period is short, the onset rapid, and where the spasms become general in 24—48 hours, generally die a few days after the spasms have appeared. The duration of the incubation period is not the only criterion, for there occur both in the hospital and in the laboratory, extremely severe cases, which have had a prolonged incubation period. Generally speaking, however, the severity of a case varies inversely with the length of the incubation period, and directly with rapidity of the onset of the spasm. Therefore, in estimating the value of the antitoxine treatment, we must consider closely several points, of which the following are the most important:—

(1) The nature and the seat of the injury: Tetanus following an injury to the head is said to be more serious, and such cases are supposed to run an acute course.

(2) The condition of the wound: It seems that suppurating wounds are followed by severer spasms than slight, superficial, or clean, rapidly-healing wounds.

(3) The duration of the incubation period: That has already been alluded to, and so has the next point.

(4) The rapidity of the onset: The more rapidly the spasms become general, the graver the outlook.

(5) The age and general condition of the individual affected: Tetanus neonatorum and puerperal tetanus are always severe.

(6) The promptness with which any kind of rational or radical treatment can be, and has been, applied.

Of these six points, the most deserving of consideration are the acuteness of the onset of general tetanic spasms and the duration of the incubation period.

Now let us examine the results so far obtained with the so-called antitoxine treatment:—

A.—To begin with, I shall enumerate all the cases, so far as I have been able to collect them from the journals and through private enquiry, without critically analysing them. They have been put in alphabetical order in Table I. (See pages 96 to 100.)

From this table we learn: (1) 31 cases have been treated with Tizzoni's antitoxine up to February, 1895. Of these 23 recovered; or we have a mortality of 25·8 per cent. (2) Seven have been treated with Behring's serum, and of these five recovered—i.e., we have a mortality of 28·57 per cent. (3) 13 cases have been treated with Roux's serum, with four recoveries—i.e., a mortality of 69·2 per cent. (4) Three cases have been treated with antitoxine of sources other than mentioned above, and of these two recovered—i.e., we have a mortality of 33·3 per cent.

This analysis will be found in Table II.

TABLE II.—COMPARISON OF THE VARIOUS ANTITOXINES.

Antitoxine.	Number of cases treated.	Cures.	Deaths.	Mortality.
Tizzoni	31	23	8	Per cent. 25·80
Behring	7	5	2	28·57
Roux	13	4	9	69·23
Other preparations..	3	2	1	33·33
	54	34	20	37·03

According to this table, Tizzoni's antitoxine comes out best, the mortality being only 25·8 per cent. But we must remember that (1) we are considering only the published cases; (2) all the cases have been put down without the slightest attempt at a critical analysis; (3) it appears from words used by Albertoni and Rotter that the Italians have refrained from publishing some of their fatal cases. Adding up all the cases treated by the serum or antitoxine method, we find that, disregarding suppressed fatal cases, of 54 cases 20 died—i.e., a mortality of 37·0 per cent; therefore we obtain figures which more or less agree with Sormanni's statistica.

B.—But now let us apply a little criticism.

(1) Of the cases treated with Behring's serum, in all fairness we must exclude one (Table I., 1), since here a very small quantity of serum was administered to an already dying infant.

(2) In one of the successful cases treated with Roux's serum, the tetanic symptoms ceased after the amputation of the injured finger, and a very small quantity of serum was injected. This case also must be disregarded (Table I., 3).

(3) Again, we should exclude all the fatal cases which died after a single day's treatment—viz., a case treated by Paget, another by Brunner, a third by Burton-Fanning, a fourth by Douglas, and a fifth by Bauer, two cases of Escherich, and four cases of Roux (Table I., 33, 3, 5, 12, 2, 13, 14, 41, 42, 43, 45—i.e., 11 fatal cases).

(4) *Per contra*, we should disregard all the successful cases where the antitoxic treatment was not begun till 10 or 15 days after the appearance of the disease, for it stands to reason that such cases prove little or nothing (Table I., 11, 17, 18, 23, 30, 32, 49, 51, 54—i.e., nine cases). Hence, subtracting these 21 cases, we have 33 cases with a mortality of 25 per cent. This result would be extremely satisfactory if it were entirely trustworthy, and beyond further criticism.

C.—Let us now arrange the 54 cases according to their severity, placing in one class all those with an acute onset or an incubation

TABLE I.
LIST OF CASES OF TETANUS TREATED WITH ANTITOXINE.

B.—Behring's Antitoxine. R.—Roux's Antitoxine. T. and C.—Tissot's Antitoxine. I.P.M.—Institute of Preventive Medicine.

No. of Case.	Reference.	Incubation.	Antitoxine.	Treatment begun.	Effect.	Amount of Antitoxine.	Result.
1	Boginsky and Kitasato.† <i>Munch. med. Wochenschr.</i> , 1893, pp. 561-564.	Advanced and acute.	B.	Too late.	Death.	Small quantity.	Death.
2	Bauer. <i>Wiener klin. Wochenschr.</i> , 1894, p. 846; <i>Brit. Med. Jour.</i> , 1894, Vol. V., Epitome 485.	7-8 days.	T. and C.	2nd day.	Death after 1 day.	2·5 grammes.	Death.
3	Berger.* <i>Pasteur's Annales</i> , VII., 1893, p. 105.	....	R.	....	Apparently independent of the antitoxine	Small quantity.	Cured.
4	Brunner. <i>Munch. med. Wochenschr.</i> , 1893, p. 573.	8 days. Spasms fully developed in 2 days.	B. (not strong).	2nd day.	Death after 2 days. Disease lasted 4 days.	100cc.	Death.
5	Burton-Fanning. <i>Brit. Med. Jour.</i> , 1894, Vol. II., p. 725.	4-7 days.	R.	4th or 1st day. Injections every 6 hours.	Death after 1 day.	....	Death.
6	Caretti. <i>Riv. Med.</i> , 17, I., 95; <i>Brit. Med. Jour.</i> , Epitome 215, March 16, 1895.	6 days. Onset slow.	T. and C.	8rd day. 5 injections during 3 days.	After 16 days. Disease lasted 5 weeks.	7·8 grammes.	Cured.
7	Casali. <i>Centralblatt f. Bakt. u. Parasitenkunde</i> , Vol. XII., p. 56; <i>Brit. Med. Jour.</i> , 1892, Vol. II., Epitome 96.	8 days. Mild and chronic case.	T. and C.	7th day. 6 injections during 4 days.	After 2-3 days. Disease lasted 8 days.	1·4 gramme.	Cured.
8	Clarke. <i>Lancet</i> , 1894, Vol. I., p. 206.	1 week.	R.	5th or 6th day, or possibly later. 4 injections during 2 days.	Cured after 7-9 days.	15 grammes.	Cured.
9	Cuniff. <i>Yorke Branch B. M. Assoc.</i> , Nov. 7, 1894.	14-16 days.	T. and C.	8rd or 4th day.	After 5 days. Disease lasted 21 days.	8 grammes.	Cured.

10	Dean. <i>Brit. Med. Jour.</i> , Sept. 15, 1894, p. 579.	10 days or more.	T. and C.	5th day. Injections.	Many injections.	After 4 days. Disease lasted 3-4 weeks.	15-75 grammes.	Cured.
11	Dörfel. <i>Münch. Med. Wochens.</i> , 1894, p. 282.	Chronic.	R.	10th day. Injections during 2 days.		After 7 days. Disease lasted at least 4 wks.	50cc.	Cured.
12	Douglas. <i>Brit. Med. Jour.</i> , 1894, Vol. II., p. 934.	5 days.	T. and C.	8th day.		Death after 1 day.	....	Death.
13	Echerich.† <i>Wiener Klin. Woch.</i> , 1893, No. 32, p. 586; <i>Brit. Med. Jour.</i> , 1893, Vol. II., Epitome 253.	5 days; 5 days;† or 1 day.	T. and C.	2nd day.		Death after 1 day.	9 grammes.	Death.
14	Echerich.† <i>Ibidem.</i>	8 or 2 days;†	T. and C.	1st day.		Death after 1 day.	93 grammes.	Death.
15	Echerich.† <i>Ibidem.</i>	11 or 7 days;†	T. and C.	3rd day.		After a few days. Disease lasted 4 months.	9 grammes.	Cured.
16	Echerich.† <i>Ibidem.</i>	12 or 9 days;†	T. and C.	3rd day.		Death after 2 days;†	5 grammes.	Death.
17	Evans. <i>Brit. Med. Jour.</i> , 1894, Vol. II., p. 481.	4 weeks.	T. and C.	10th day.		After 4 days. Disease lasted 4 weeks.	2-28 grammes.	Cured.
18	Fenwick (Hurry). <i>Brit. Med. Jour.</i> , 1895, Vol. I., p. 418.	10 days.	T. and C.	13th day.		After 8 days. Disease lasted 37 days.	10-12 grammes.	Cured.
19	Finotti. <i>Wiener Klin. Wochens.</i> , 1892, No. 1; <i>Brit. Med. Jour.</i> , 1892, Vol. I., Epitome 125.	12 days.	T. and C.	4th or 10th day. Injections.	28 injections.	After 14 days. Disease lasted 25 days.	About 5 grms.	Cured.
20	Finotti. <i>Rif. Med.</i> , 1892, II., p. 806; <i>Wiener Klin. Wochens.</i> , 1892, p. 431.	16 days.	T. and C.	1st day. 23 injections.		After 7 days. Disease lasted 8 days.	4-8 grammes.	Cured.
21	Finotti. <i>Rif. Med.</i> , 1892, p. 264; <i>Wiener Klin. Wochens.</i> , 1893, p. 121.	24 days.	T. and C.	5th day. 11 injections.		After 13 days. Disease lasted 18 days.	2-75 grammes.	Cured.
22	Firth.† <i>Brit. Med. Jour.</i> , 1895, Vol. I., p. 132.	7-8 days.	T. and C.	8th day.		Death after 8 days.	2 grammes	Death.
23	Gagliardi. <i>Rif. Med.</i> , 1892, II., No. 76, p. 5.	12 days.	T. and C.	11th day. 4 injections.		After 6 days.	1 gramme.	Cured.
24	Gattai. <i>Centralblatt f. Bakt. u. Parasitenkunde</i> , Vol. XIV., p. 108; <i>Brit. Med. Jour.</i> , 1893, Vol. II., Epitome 194.	6 days.	T. and C.	4th day. 14 injections.		After 6 days. Disease lasted 20 days.	About 5 grms.	Cured.
25	Giusti and Bonaiuti. <i>Brit. Klin. Wochens.</i> , 1894, p. 818; <i>Brit. Med. Jour.</i> , 1894, Vol. II., Epitome 214.	21 days;†	T. and C.	5th day. 9 injections.		After 5 days. Disease lasted 10 days.	190cc.	Cured.

TABLE I.—Continued.

No. of Case.	Reference.	Incubation.	Antitoxine.	Treatment begun.	Effect.	Amount of Antitoxine.	Result.
26	Hacker (von). <i>Wiener klin. Wochens.</i> , 1894, p. 463.	11 days.	T. and C.	6th day. Injections for 12 days.	Disease lasted 18 days.	8.55 grammes.	Cured.
27	Hacker (von). <i>Ibidem</i> .	5-6 weeks.	T. and C.	5th day. Injections for 4 days.	Disease lasted 16 days.	4.06 grammes.	Cured.
28	Leid. <i>Rif. Med.</i> , Aug. 18, 1893; <i>Centralblatt f. Bakt. u. Parasitenkunde</i> , 1893, Vol. XIV, p. 893; <i>Brit. Med. Jour.</i> , 1893, Vol. II, Epitome 295.	6 days.	T. and C.	2nd day. 4 injections.	Disease lasted 7.12 days.	100cc.	Cured.
29	Magagnoli. <i>Rif. Med.</i> , 1893, No. 28.	8 days.	T. and C.	3rd day. 11 injections.	....	2.75 grammes.	Cured.
30	Marriott. <i>Brit. Med. Jour.</i> , 1895, Vol. I, p. 132.	6 days.	T. and C.	12th day. Numerous injections.	After 15 days. Disease lasted 3-4 weeks.	13.2 grammes.	Cured.
31	Moritz. <i>Munch. med. Wochens.</i> , 1893, p. 561-564.	Chronic. Onset 5 days.	B.	8th day. 4 injections.	After 8 days. Disease lasted at least 4 wks.	95cc.	Cured.
32	Pacini. <i>Rif. Med.</i> , Jan. 7, 1892; <i>Brit. Med. Jour.</i> , 1892, Vol. I, Epitome 83.	10 days (light case).	T. and C.	15th day. 8 injections.	After 4 days. Disease lasted 12 days.	2 grammes.	Cured.
33	Paget. <i>Lancet</i> , 1894, Vol. I, p. 513.	Acute.	R.	Begun too late.	Death early.	....	Death.
34	Parker (Rushton). <i>Lancet</i> , 1894, Vol. II, p. 1220; <i>Brit. Med. Jour.</i> , 1894, Vol. II, p. 1178.	Chronic. 2-4 weeks.	T. and C.	8th day.	After 7 days.	5.75 grammes.	Cured.
35	Ranke (von). <i>Munch. med. Woch.</i> , 1893, p. 571.	3 weeks. Onset 7-8 days.	B.	9th day. 5 injections.	After 2 days. Disease lasted about 3 weeks.	50cc.	Cured.
36	Remesoff and Fedoroff. <i>Centralblatt f. Bakt. u. Parasitenkunde</i> , Vol. XV, p. 115.	4 or 10 days.	Dog.	7th or 4th day.	Disease lasted 20 days.	200cc.	Cured.
37	Remesoff and Fedoroff. <i>Ibidem</i> .	Short.	Dog and rabbit.	3rd day.	Death after 9 days.	150cc.	Death.

38	Rénon. <i>Pasteur's Annals</i> , VI., 1892, p. 293.	Acute. 7 days.	R.	On 5th day.	Death after 2 days. Disease lasted 7 days.	80cc.	Death.
39	Rénon. <i>Ibidem</i> , 1893, p. 298.	Long incubation period. Onset rapid.	R.	3rd day.	Death after 6 days. Disease lasted 9 days.	87cc.	Death.
40	Rotter. <i>Deutsche med. Wochenschr</i> , 1893, p. 7. Behring. <i>Die Blutserum-Therapie</i> , II., p. 84.	8 days at least (8-15 days). Slow onset. Chronic.	B.	14th or 7th day. 5 injections.	After 8 days. Disease lasted 31 or 34 days.	270cc.	Cured.
41	Roux and Vallard. <i>Pasteur's Annals</i> , VII., 1893, p. 123.	? ? 15 days. Acute onset.	R.	4th day.	Death on 2nd day. Duration of disease, 6 days.	147cc.	Death.
42	Roux and Vallard. <i>Ibidem</i> , p. 125.	7 days.	R.	4th day.	Death next day. Duration, 5 days.	108cc.	Death.
43	Roux and Vallard. <i>Ibidem</i> , p. 126.	5 days.	R.	36 hours.	Death next day. Duration, 2 days.	20cc.	Death.
44	Roux and Vallard. <i>Ibidem</i> , p. 127.	7 days. Acute onset.	R.	36 hours.	Death after 4 days. Duration, 5 days.	402cc.	Death.
45	Roux and Vallard. <i>Ibidem</i> , p. 129.	14 days. Acute onset.	R.	2nd day.	Death next day. Duration, 3 days.	247cc.	Death.
46	Roux and Vallard. <i>Ibidem</i> , p. 130.	15 days. Mild and chronic. Slow onset.	R.	8rd day. 3 injections during 2 days.	After 3-4 days. Duration, 39 days.	265cc.	Cured.**
47	Roux and Vallard. <i>Ibidem</i> , p. 132.	? ? Mild and chronic. Slow onset.	R.	7th day. 5 injections in 6 days.	After 2-4 days. Duration, 30 days.	300cc.	Cured.
48	E. Schwarz. <i>Wiener med. Wochenschr.</i> , 1894, p. 2092.	Not stated. Acute.	T. and C.	4th day.	Improved during 4 days. Died suddenly from cardiac failure. Disease lasted 8 days.	4 grammes.	Death.
49	R. Schwarz. <i>Rif. Med.</i> , 1891, October 15. <i>trib. f. Bakt. und Par.</i> , Vol. X., No. 24.	14 days.	T. and C.	14th day.	After 5 days. Disease lasted 29 days.	1 gramme.	Cured.

TABLE I.—Continued.

No. of Case.	Reference.	Incubation.	Antitoxine.	Treatment begun.	Effect.	Amount of Antitoxine.	Result.
50	Taruffi. <i>Centralbl. f. Bakt. und Par.</i> , 1892, Vol. XI., p. 625. <i>Rif. Med.</i> , 1892, April 21. <i>Brit. Med. Journal</i> , 1892, Vol. I., Epitome, p. 410.	10 days.	T. and C.	2nd day. 6 injections.	Cured in 11 days. Disease lasted 18 days.	1·5 gramme.	Cured.
51	Tizzoni. <i>Gaz. degli Osp.</i> , 1892, p. 88. <i>Rif. Med.</i> , 1892, No. 160.	11 days.	T. and C.	10th day. 22 injections.	After a few days.	50–80cc. and 1·35 gramme.	Cured.
52	Washbourn. Private Communication.	Not known. Mild and chronic case.	L. P. M.	7th day. 13 injections.	After 5 days. Disease lasted 19 days.	120cc.	Cured. Never had general spasms.
53	Williamson. <i>Brit. Med. Journ.</i> , 1895, Vol. I., p. 419.	11 days.	T. and C.	2nd day.	Treatment for 9 days.	7 grammes.	Death.
54	Ziemssen (von). <i>Müsch. med. Wochenschr.</i> , 1893, p. 572.	7–8 days. Onset in 2 days.	B.	15th day. 4 injections.	After several weeks.	100cc.	Cured.

* "Après l'amputation du doigt les accidents cessèrent ; a reçu quelques injections du sérum, mais en si petite quantité qu'elles n'eurent guère pu avoir l'influence sur la marche de la maladie."

† Tetanus Neonatorum.

‡ Two dates are given ; the longer period refers to the day of life, the shorter is reckoned from the shedding of the umbilical cord.

§ Post-mortem, advanced pneumoniae are found, sufficient to have caused death.

|| A case of so-called "head-tetanus" (Kopf-Tetanus).

¶ There was some improvement ; pulmonary symptoms appeared, and after death pneumonia was found.

** Roux says of his successful cases : "À aucun moment ces deux cas malades n'ont donné de sérieuses inquiétudes."

period which lasted one week or less, and in the second class those with a more prolonged incubation period and a delayed onset. These have been separated in Table III., A and B. (See pages 102—3.)

Class A includes all the cases which are characterised as acute by those who have reported them, or the incubation period of which amounted to seven days or less, or which were evidently acute. I have included all those with an incubation period of 7—8 days, and also those which, though they show a short incubation period, are probably, if not evidently, chronic, because by so doing I cannot lay myself open to the charge of invidious criticism. We find that of 26 cases, 18 died—i.e., 69·2 per cent. But, if we subtract (1) the cases which either in their reports were considered to be mild and chronic, or which, from their duration, we might refuse to call severe or acute (i.e., Table I., 6, 15, 24, 30, 36, 54); and (2) those which died after a day's treatment—i.e., where probably therapeutic measures were employed hopelessly late (Table I., 1, 2, 5, 12, 13, 14, 33, 41, 42, 43, 45); and (3) a case where death may have been due to pneumonia (Table I., 37): We have eight cases, with six deaths, or a mortality of 75 per cent, the two recoveries being Cases 28 and 8. Now, in Case 8, which is reported in the *Lancet* by Dr. Clarke, the data are scant, and the treatment was not begun until the fifth and sixth day after the appearance of tetanus, or even later, so that in a critical analysis this case cannot count, and thus of seven cases only one recovered—i.e., a mortality of 85·7 per cent. This criticism may appear unduly severe, but I claim that it is legitimate, because doubtful cases are of little if any use when it is our object to determine the value of a new treatment.

In Class B, on the other hand, we have 38 milder or more chronic cases, with six deaths, or a mortality of 15·78 per cent. Now, from this list we must subtract Nos. 14, 22, 2, 4, since these cases, from the accounts given, appear to be acute. Doing so, we reduce the mortality of chronic or milder cases to 5·7 per cent. We find, therefore, an almost appalling mortality amongst the really acute and severe cases; and, if we consider the limited number treated, and also that fatal cases have been suppressed, it may be questioned whether the serum treatment has lessened the seriousness and hopelessness of the prognosis to any appreciable degree. Of the 31 cases treated with Tizzoni's antitoxine, three only (22, 28, 48) can be considered as more or less genuine test cases, and of these only one survived. The acute cases treated with Roux's serum all died, if, as we justly may do, Case 8 be disregarded. The results then are not encouraging. It is futile, however, to argue from a small number of cases. This becomes evident when we refer to Socin, who, in his "*Kriegschirurgische Erfahrungen*," records

TABLE III.—CASES ARRANGED ACCORDING TO LENGTH OF INCUBATION-PERIOD AND ACUTENESS OF ONSET.

Class A.—*Acute Cases* (Short Incubation and Rapid Onset).

No. of Case.	Incubation Period.	Antitoxine.	Result.	Remarks.
14*	2 or 8 days.	T. and C.	Death.	Death after 1 day.
5	4-7 days.	R.	Death.	Death after 1 day.
36*	4-(10) days.	Dog.	Cured.	<i>Disease lasted 20 days, and was therefore not acute.</i>
12	5 days.	T. and C.	Death.	Treatment begun too late.
13	5 days.	T. and C.	Death.	Death after 1 day.
6*	6 days.	T. and C.	Cured.	<i>Disease lasted 5 weeks, and was therefore probably mild.</i>
24*	6 days.	T. and C.	Cured.	<i>Disease lasted 20 days, and was therefore not acute.</i>
30*	6 days.	T. and C.	Cured.	<i>Disease lasted 21-28 days, and was therefore not acute.</i>
28	6 days.	T. and C.	Cured.	.....
8	7 days.	R.	Cured.	.....
2*	7-8 days.	T. and C.	Death.	Death after 1 day.
22*	7-8 days.	T. and C.	Death.	.....
54	7-8 days.	B.	Cured.	<i>Disease lasted at least 2 weeks or longer, and was therefore hardly acute.</i>
15*	7-11 days.	T. and C.	Cured.	<i>Disease lasted 4 months, and was therefore not acute.</i>
4*	8 days.	B.	Death.	Onset rapid, hence an acute case.
1	Not given.	B.	Death.	Treatment begun too late.
33	Not given.	R.	Death.	Treatment begun too late.
37	Not given.	?	Death.	Death possibly due to pneumonia
38	7 days.	R.	Death.	.....
39	Long (?)	R.	Death.	Although the incubation was said to have been prolonged, this case is so evidently acute that it must be included here.
41	? 15 days.	R.	Death.	This remark also applies to this case. Treatment begun too late.
42	7 days.	R.	Death.	Death after 1 day.
43	5 days.	R.	Death.	Death after 1 day.
44	7 days.	R.	Death.	.....
45	14 days.	R.	Death.	See remark to Cases 39 and 41. Death after 1 day.
48	Not given.	T. and C.	Death.	.....

Total, 26.—18 deaths=69·2. 8 cures.

* These cases are also included in Table III. B.

TABLE III.—Class B. *Chronic Cases (Prolonged Incubation and Delayed Onset).*

No. of Case.	Incubation Period.	Antitoxine.	Result.	Remarks.
27	35-42 days.	T. and C.	Cured.	.....
17	28 days.	T. and C.	Cured.	.....
21	24 days.	T. and C.	Cured.	.....
25	21 days.	T. and C.	Cured.	.....
35	21 days.	B.	Cured.	.....
20	15 days.	T. and C.	Cured.	.....
9	14-15 days.	T. and C.	Cured.	.....
40	8-15 days.	B.	Cured.	.....
49	14 days.	T. and C.	Cured.	.....
19	12 days.	T. and C.	Cured.	.....
23	12 days.	T. and C.	Cured.	.....
16	12 or 9 days.	T. and C.	Death.	.....
51	11 days.	T. and C.	Cured.	.....
53	11 days.	T. and C.	Death.	.....
26	11 days.	T. and C.	Cured.	.....
15*	11 or 7 days.	T. and C.	Cured.	.....
10	10 d'ys at least	T. and C.	Cured.	.....
18	10 days.	T. and C.	Cured.	.....
32	10 days.	T. and C.	Cured.	.....
56	10 days.	T. and C.	Cured.	.....
36*	4 or 10 days.	Dog.	Cured.	.....
7	8 days.	T. and C.	Cured.	.....
29	8 days.	T. and C.	Cured.	.....
14*	8 or 2 days.	T. and C.	Death.	From history and rapid onset, really an acute case.
22*	7-8 days.	T. and C.	Death.	Possibly an acute case.
54*	7-8 days.	B.	Cured.	.....
2*	7-8 days.	T. and C.	Death.	From the history and rapid onset, really an acute case.
4*	8 days.	B.	Death.	Onset was extremely rapid, really an acute case.
11	Chronic.	B.	Cured.	.....
52	Mild & chronic	I. P. M.	Cured.	.....
3*	Not given : } chronic.	B.	Cured.	.....
31		B.	Cured.	.....
24		T. and C.	Cured.	.....
46		B.	Cured.	.....
47		B.	Cured.	.....
6*	6 days.	T. and C.	Cured.	From the history this case may be considered to belong to this class.
24*	6 days.	T. and C.	Cured.	See Remark to 6.
30*	6 days.	T. and C.	Cured.	See Remark to 6.

Total, 38. 6 deaths=15.78 per cent. 32 cures.
 * These cases are also included in Table III, A. † See Table I.

four acute cases with three deaths, and three milder cases with no deaths; and this was in 1872. Preobajensky reports on four acute cases treated with morphine and chloroform, of which three survived. In estimating the value of Tizzoni's antitoxine, one point comes out strongly—viz., that of 31 cases treated with it, 24 at least were either chronic or mild cases, and this, no doubt, sufficiently accounts for the success apparently obtained with the same, as compared with the poor results obtained with other antitoxines.

Yet it must be granted that in mild cases the new treatment seems to be of use, because a mortality of only 5·7 per cent is an extremely good result, if trustworthy, and if we were not always haunted by the culpable suppression of fatal cases. But even if we make allowance for this omission, the statistics of Table III. B prove that with the antitoxine we obtain better results in milder cases than with other forms of treatment, and since, as Roux says, "*dans la pratique on ne choisit ni les cas ni le moment de l'intervention,*" our duty lies clearly before us, viz., to combine the serum treatment with other recognised modes of treatment, as, *e.g.*, amputation, chloral, etc.

D.—There is yet another point to be considered, viz., the duration of the spasms after the commencement of the disease. Singling out the 8 surviving cases from Table III. A (36, 6, 24, 30, 28, 8, 54, 15), we find that in one (15), in spite of the antitoxine, the spasms lasted four months, in five they lasted at least 20 days (6, 30, 24, 36, 54), and in Clarke's case (8) about a fortnight. We may express doubt whether cases in which the spasms lasted 20 days or more have any claim to be included among the serious cases, and from the standpoint of a critic I should be inclined to disregard all such cases, were it not that I feel uncertain, and would fain believe that the prolongation of the course of the disease has been caused by the antitoxine. I cannot separate myself from the experience gained through experimental work in the laboratory. But, nevertheless, we must not forget that cases with a short incubation period which run a prolonged course present a more favourable prognosis than cases with an equally short incubation period and a rapid course. If we were to accept all the cases in Table III. A without discrimination as acute cases, and excluded all the cases which in duration extended over at least three weeks, we should have 20 cases with a mortality of 90 per cent. I do not consider this quite fair, however, for reasons stated above.

I am, on the other hand, strengthened in my scepticism and doubt when I consider the dates on which the treatment was begun in these successful cases, for in one case it was delayed for seven days, in another for 12 days, in a third for 15 days, and in a fourth case for five to six days at least after the spasms had appeared. Now are there really any

cases of seriously acute tetanus which live seven to 14 days! Most of them die three to five days after the onset. All these points have been arranged in tabular form in Table IV. A and B.

TABLE IV.—EFFECTS OF ANTITOXINE ON DURATION OF DISEASE.

A.—Successful Acute Cases.

No. of Case.	Treatment begun.	Duration of Spasms after Antitoxine Treatment began.	Duration of Disease.	Remarks.
15	3rd day.	..	4 months.	....
6	3rd day.	14-16 days.	5-6 weeks.	Spasms remained localised for 3 days, and became worse after injections.
30	12th day.	15 days.	21-28 days.	....
24	4th day.	..	20 days.	....
36	7th day.	13 days.	20 days.	....
54	15th day.	At least 7 days.	Several weeks.	....
28	2nd day.	..	7-12 days.	....
8	5th or 6th day or later.	7 days.	12-15 days.	....

B.—Fatal Chronic Cases.

No. of Case.	Onset.	Duration of Disease.	Remarks.
16	Rapid.	5 days.	Acute case (?).
54	..	11 days.	....
15	Rapid.	2 days.	Acute case.
22	..	11 days.	....
2	Rapid.	8 days.	Acute case.
4	Rapid.	4 days.	Acute case.

E.—In 20 cases, acute or chronic, I have been able to obtain information regarding the amount of dried antitoxine (Tizzoni and Cattani) used. It is difficult, perhaps, to draw a logical inference from such comparison as to the value of the antitoxine, especially as the potency of the material is a variable quantity. However, the differences in immunising power are not so very great, and also, on referring to the original reports, we find that the larger doses in Table V. belong to more recent times, when the immunising or curative power had been greatly intensified, and after the antitoxine had been offered for sale as a commercial article of definite strength. Reference to Table V. will therefore prove instructive.

TABLE V.—DOSE OF ANTITOXINE AND ITS EFFECT.

No. of Case.	Year.	Amount of Antitoxine.	Improvements.	Remarks.
		Grammes.		
10	1894	15.75	After 4 days.	This table includes only successful chronic or mild cases treated with Tizzoni's antitoxine.
30	1895	13.20	" 15 "	
18	1895	10.12	" 8 "	
26	1894	8.55	(?)	
9	1894	8.00	After 5 days.	
6	1895	7.80	" 14-16 days.	
19	1892	5.00	" 14 days.	
84	1894	5.75	" 7 "	
24	1893	5.00	" 6 "	
20	1892	4.80	" 7 "	
27	1894	4.05	(?)	
21	1893	2.75	After 13 days.	
29	1893	2.75	....	
17	1894	2.28	After 4 days.	
32	1892	2.00	" 4 "	
50	1892	1.50	....	
7	1892	1.40	After 2-3 days.	
23	1892	1.00	" 6 "	
49	1891	1.00	" 2 "	
15	1893	0.90	" a few "	

We find that the large doses belong to 1894 and 1895, while the small doses belong almost entirely to 1891 and 1892, i.e., to the time when this treatment was in its infancy and the immunising power known to be less than it is now. Is it reasonable, therefore, to ascribe the cure in all these chronic or mild cases to Tizzoni's *specificum*? I will not pursue this line of argument further, but leave it to the reader to digest the meaning of the figures. In any case we must be struck by the marked differences in the doses required to effect cures in milder cases. Now in diphtheria the amount of serum used is subject to less variation, and varies proportionately with the severity of the individual cases. It is possible, of course, that in tetanus often more antitoxine than was necessary has been administered; nevertheless the fact remains, that, accepting the figures as they stand, the disproportion between the doses and the severity of the disease is both striking and anomalous.

F.—If, in conclusion, we shortly turn our attention to the chronic or milder cases, we find, among those which survived, five with an incuba-

tion period of at least twenty days, and four with an incubation period lasting from 14—20 days. Again, as to the duration of the disease, we find that at least one-third of the cases recovered after an illness which extended over at least twenty days. Is it improbable that these cases would have survived without the antitoxine?

We cannot pursue this analysis further. Summing up, it seems that the serum treatment has not actually changed the prognosis in acute and serious cases. I believe, from the accounts of cases, that in milder cases it lessens the spasms, the pain, and the distress, and that, apparently, it has reduced the mortality of such cases, but to what extent we cannot tell until we are in possession of a larger number of cases, and until we are certain that *all* cases are published. I am not posing as an opponent of the serum treatment, but I ask it to be clearly understood that, so far as tetanus is concerned, the antitoxine is still on its trial, and that no really acute, or otherwise hopeless, case has yet been cured. While the whole matter is in such an undeveloped condition, it is preposterous that the Italians should tempt us to pay an immoderate and exorbitant price for a substance which may turn out to be of little use as a curative agent. Antitoxic serum is now obtainable from the Institute of Preventive Medicine at a nominal figure. It is our duty to use it in all but hopeless cases, and, where an occasion arises, to employ it for the purpose of preventive inoculation, *i.e.*, in injuries which have been contaminated with dirt or earth, and which have not received immediate attention or could not be thoroughly cleaned.

Clinic.

TWO CASES OF EXTRA-UTERINE GESTATION.

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THE following two cases of extra-uterine pregnancy illustrate, among other features, some difficulties of diagnosis which such cases occasionally present. They appear to be worthy of record also on other grounds, to which attention will be called after the main facts have been mentioned.

Case 1.—Mrs. P., æt. 34, married 8 years; never been pregnant; always enjoyed good health both before and after marriage until the present illness began. Menstruation was always regular, the periods

lasting from three to four days. Early in April, 1893, she had a severe attack of influenza, and was attended by Dr. Ferguson. On recovery from the acute illness she went to Blackpool to recruit, April 22nd, having at that time missed two menstrual periods. While at Blackpool she began to suffer from sickness and had a good deal of pain in the pelvis and abdomen. The pain came on quite suddenly one day without apparent cause. She returned from Blackpool on one of the last days of April feeling ill, and was from that time attended by Dr. Ferguson until her final recovery after operation. The doctor found her suffering from abdominal pain, with the uterus enlarged, and there was an unusual amount of leucorrhœal discharge. The patient was confined to bed from the time of her return home, and the symptoms, chiefly pain and sickness, were relieved to some extent by suitable medicinal treatment. On May 24th Dr. Ferguson made a vaginal examination, and ascertained that there was considerable change in the state of matters in the pelvis, the uterus being enlarged, with some indefinite thickening about the broad ligaments, and also that there was extreme sensitiveness to touch. Having completed the interview with the patient, he was just leaving the house, when he was called back, on account of some fresh symptoms which had alarmed the nurse. On returning to the patient's room he found her in very great pain, and so pale as to suggest shock or internal hæmorrhage. We had a consultation on the following day, and a partial examination was made, but owing to the extreme sensitiveness of the parts and abdominal tenderness, a thorough examination was impossible, and the general condition of the patient was such that we did not feel justified in giving her an anæsthetic. A provisional diagnosis of tubal pregnancy with rupture was then made, but as there was no indication of the hæmorrhage of the previous day having continued it was agreed to have the case closely watched, in the hope that some improvement might take place, and then to make a thorough examination with the help of an anæsthetic. It was also agreed that if, in the meantime, the condition of the patient became distinctly worse, operation should be at once resorted to. The patient's condition improved, and she was examined under an anæsthetic on the 4th of June. The chief points ascertained then were: that the pelvic floor was depressed, there was irregular resistance suggesting the presence of comparatively firm masses and fluid, the movements of the uterus were interfered with, and a considerable amount of peritonitis had taken place. The diagnosis of ruptured Fallopian tube was considered as settled, and operation without further delay was recommended. This advice was accepted, and the operation was performed on the following day. At 8 a.m. on the morning of the operation the patient's temperature was 99° and the pulse 106. The operation was begun at 5 p.m.

On opening the abdominal cavity by the usual central incision, there was a moderate flow of black blood. When the fingers were passed towards the pelvis some slight resistance from blood clot, and recent inflammation was met with. The enlarged uterus was identified as a landmark pretty nearly in the middle line, and it was soon apparent that there was a very abnormal state of matters all across the pelvis. When the ovary and tube were sought for on the right side the disturbance of the parts was followed by an alarming amount of arterial hæmorrhage. Old blood clots were quickly removed, the adhesions broken down, and the mass assumed to be the seat of the ruptured ovum brought upwards. The hæmorrhage was, however, such that it did not seem prudent to wait for ligation in the ordinary way, and strong pressure forceps were put down to clamp the outer end of the broad ligament, and also the cornu of the uterus. This stopped the bleeding on the right side, and it was then found that the comparatively slight exploration had also set up hæmorrhage in the left side. Clamping in the same manner as on the right side was followed by the same result. The mass on the right side was now removed with difficulty, owing to the rigidity of the tissues, and the absence of any recognisable part from which to form a pedicle. The Fallopian tube was distinct enough near the uterus, and this was ligated and cut through on the side next the mass. Other parts, presumably meso-salpinx and meso-ovarium, were then formed into a pedicle. The tissues held by the forceps at the outer extremity of the broad ligament, were tied for security by a separate silk thread.

The left side was still more difficult to manage. Neither tube nor ovary could be clearly identified during the operation. Only shreds of tubal tissue, membranes, and what was presumed to be decidua, could be found, and these were separated, together with firmly adherent old blood clot and fibrinous shreds, after ligaturing in several portions the connection with the broad ligament.

The blood clots firmly adherent to the broad ligaments and to the floor of the pelvis were got away by manipulation, and the pelvis was flushed with warm saline solution, and a glass drainage tube introduced.

The patient's condition before the opening had been satisfactory, and there was reason to suppose it would improve further. For several days the temperature had varied from normal to nearly 100°, and the pulse continued steadily from a little under to a little over 100. The pain had considerably diminished, but the distension was much the same as it had been for two or three weeks. She was also occasionally sick, as from the beginning of the illness. There was a good deal of blood lost during the operation, and for several days succeeding there was a rapid pulse. The temperature never at any time rose to more than 100·5°.

Vomiting did not recur after the first forty-eight hours. Convalescence was somewhat tedious, but not marked by any incident implying danger. Drainage was continued by means of a suitable tube until the 12th of June.

On examination of the parts removed during the operation, it was found that extra-uterine pregnancy had existed on both sides. On the left side the tube had ruptured at a very early period, probably during the attack of influenza, complicating its symptoms, and exaggerating its effects, so as to make the change to Blackpool an urgent necessity. There was probably not much hæmorrhage when the left tube gave way, but the hæmatocele and peritonitis caused some adhesions and contractions, which greatly changed the structures on the left side, and pre-

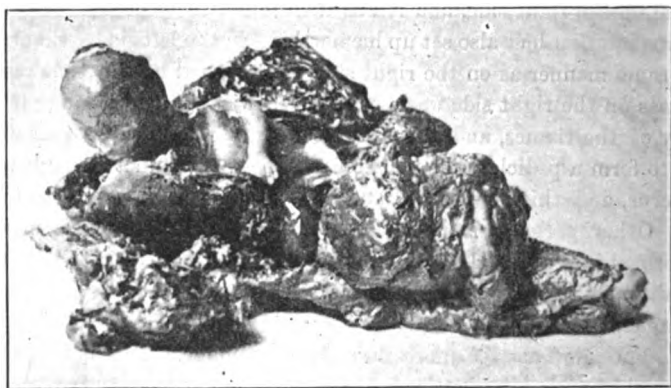


FIG. 1.

vented the more severe symptoms from hæmorrhage when rupture occurred on the right side. The rupture on the right side almost certainly happened when the sudden pain came on one day during the residence in Blackpool. The pregnancy then dated two months, and the rupture occurred at the time corresponding to the menstrual congestion. The severe hæmorrhage which occurred after examination in May came on also at a time corresponding to the menstrual congestion.

The ovum on the right side had developed in the outer extremity of the tube, and either from the first or after the rupture of the left tube, the ovary became involved in the mass containing the embryo. Fig. 1 is from a photograph of the parts removed when freed from old blood clots. It shows the tube to the right where it was cut, and the thick covering of the embryo, consisting of decidua, chorionic tissue, mem-

brane, and tube. The embryo was exposed by separating from one side of the mass the flattened and otherwise modified ovary, which formed a portion of the cyst by which the ovum was surrounded. Fig. 2 shows the nidus in which the embryo lay, the embryo itself being removed to the side so as to show the cavity and the cord.

There are some curious points in this case. The patient had been married eight years, and had never suffered from any affection of the sexual organs sufficient to compel her to seek medical treatment. She was sterile without any apparent cause, and the presumption was all against pregnancy being the cause of her troubles when she became ill. Not only was the case one of pregnancy, but it assumed the extra-

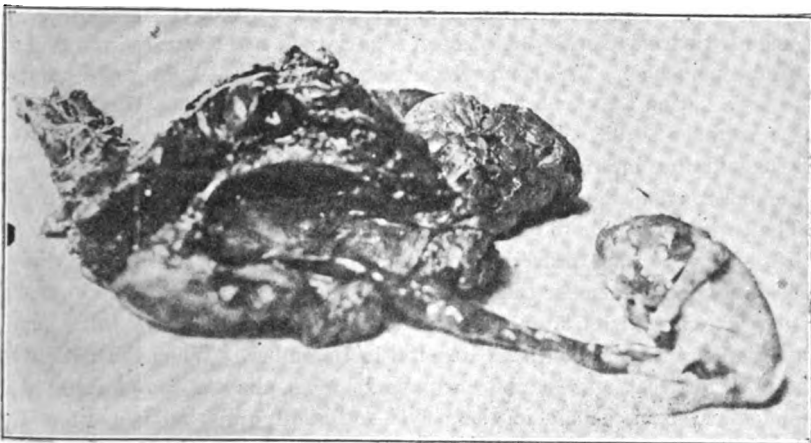


FIG. 2.

ordinary form of extra-uterine pregnancy on both sides. The early symptoms of pregnancy were obscured by an attack of influenza, and probably the symptoms of the influenza were mixed up with, and were apparently exaggerated by, the very early rupture of the left tube. Among the effects of this rupture was probably the pelvic peritonitis, causing slight adhesions, which prevented the rupture of the tubo-ovarian ovum on the right side from producing more severe and dangerous hæmorrhage in the following month. For at least a month after this second rupture the patient suffered from pain in the pelvis and sickness, but there is no clear evidence of further hæmorrhage until an examination coincided with the time at which menstruation should have come on, the more exact and detailed examination having been brought about by an exacerbation of the symptoms by the periodic physiological con-

gestion. The case also illustrates the advantage of careful examination, with the aid of an anæsthetic, in cases of obscure pelvic disease before definitely settling the diagnosis, and deciding on an important operation.

Case 2.—Mrs. B., æt. 32, housewife; married 11 years; one child 10 years ago, living; one miscarriage. Menstruation began at 16, period five to six days—rather profuse; not much pain. Since the illness seven years ago menstruation has been somewhat irregular. Admitted to the Manchester Southern Hospital December 11, 1894.

There is a history of severe illness seven years ago with flooding, and the patient has suffered more or less from abdominal pains ever since. She was at that time confined to bed seven weeks. Menstruation returned after this illness, and became normal. She was fairly well until March last year, when uterine hæmorrhage began and continued until May. In the month of April she took to bed, and was under medical treatment until September. The patient had severe pain during the hæmorrhage. The hæmorrhage ceased about a week after she went to bed. From that time until September, there was no menstruation or hæmorrhage at all. During the whole of the time she was confined to bed suffering, intermittently, severe pain. In September, after considerable exertion, she had uterine hæmorrhage lasting 14 days continuously. The patient was able to be up at times in August, but had to return to bed, owing to the recurrence of pain. She was so well about the beginning of September that medical attendance ceased, with the exception of a few visits later. The patient lived an invalid life until her admission into the Southern Hospital in December. When the patient applied for treatment at the out-patients' room, she was complaining of abdominal pain, chiefly in the pelvis and right groin. The pain was increased by exertion. The vessels and nerves of the right leg were not affected. On superficial examination there was discovered a rounded tumour in the lower part of the right iliac region, dull on percussion, but an attempt at vaginal examination had to be given up owing to the pain which it seemed to produce. She was advised to come into the hospital.

After her admission she was again examined, and the mass above the right groin was found to be continuous with a tumour which came low down in the pelvis and pushed the uterus aside, forwards, and to the left. It appeared to be a solid ovarian tumour, and the irregularities of resistance on palpation, and the presence of adhesions, suggested a dermoid cyst which had undergone inflammation. There was still much tenderness on pressure. Nothing abnormal could be made out on the left side, which was crowded and obscured by the uterus. The patient was very anæmic and weak at the time of admission, and she suffered from bronchitis to such an extent that it was not thought prudent to

subject her to operation. She improved considerably in condition, but in spite of the delay of two months before the operation she had an attack of bronchitis just after the operation, and her chief danger arose from the chest affection.

Owing to the confused and contradictory statements made by the patient, it was impossible to interpret the meaning of symptoms mentioned, to make out when the tumour began to give trouble, or what relation its growth had to the hæmorrhage, either in the spring or autumn. I applied to Dr. R. C. Smith, of Ardwick, who had attended her at home, and he kindly supplied me with some important information.

Dr. Smith first visited the patient in April, 1894, and attended her until she was admitted into the Southern Hospital. She was at first suffering from menorrhagia. The patient suffered severe pain, and Dr. Smith's treatment was intended to diminish the menorrhagia and to relieve the pains. He attempted to examine her on May 7, but she screamed so much that he had to desist, and on the Sunday following, in order to examine her, he had to administer an anæsthetic. Dr. Smith made the examination per rectum and per vagina, and he could feel there was a great enlargement, but cannot say now (February, 1895), with any degree of certainty, the exact position of the tumour. On passing the sound nothing could be felt in the uterus. Dr. Smith said it was a case for operation, and advised the patient to apply for admission into the hospital, but she refused. It was not until late in the year that she became alarmed, and was persuaded by a neighbour to go to the hospital.

The tumour had not changed in size or consistency since it was first observed, except that the tenderness on pressure had almost disappeared.

Operation, February 23, 1895.—After the patient was anæsthetised and ready for operation, a careful examination of the pelvis was made. It was ascertained that the tumour appeared to be divided into two parts of about equal size, forming an obtuse angle with one another; one portion descended low, bulging below the uterus in Douglas's space. This part was firm and somewhat elastic, giving the impression of a small, very compressible, foetal head, the cranial bones being very distinctly separated and movable. The upper or horizontal portion rising above the brim of the pelvis was firm and apparently solid.

From the history of the case, tubal pregnancy seemed extremely improbable, but the diagnosis rested between it, and dermoid tumour of the ovary. On opening the peritoneum by an incision estimated as sufficiently large to permit the tumour to be brought through without diminution in its size, some firm adhesions of omentum had to be torn down in order to reach the mass itself. It was then found impossible to raise the tumour up, in spite of slight adhesions both to uterus and peri-

toneum posteriorly having been broken down as far as the fingers could reach. The right broad ligament was greatly thickened, and the pedicle of the tumour, whatever it was, was very short and firm.

The right Fallopian tube, which was greatly hypertrophied near the uterus, was firmly ligatured, and cut through on the side next the tumour. It was then possible to pass the finger between the tumour and the posterior surface of the broad ligament, and form a broad thick pedicle of mesosalpinx and other structures. This pedicle was ligatured in separate portions, and gradually cut through. It was then possible, partly by drawing on the tumour with volsellæ, which readily tore through, and by getting an assistant to push it upwards from the vagina, to draw out the tumour. There was no fluid, or remnant of blood clot in the pelvis. It was then ascertained that the left broad ligament was the seat of an old-standing inflammation, and the ovary appeared to be felt through the thick pseudo-membrane. The left tube itself was hypertrophied, lengthened, and congested, but not otherwise greatly changed. The pseudo-membrane was broken down and the left ovary removed. It was found to be so completely changed by the old-standing pressure from contraction of products of inflammation that in attempting to form a pedicle it came away from its attachments without any ligation of vessels, no hæmorrhage resulting. A drainage tube was introduced and the wound closed in the ordinary way.

The principal thing to record in the after-treatment of the case is the occurrence of an attack of bronchitis, which came on the third day after the operation. There was a good deal of distress from cough. The highest respiration recorded was 37, and the highest temperature 100°. There is little in the case from the abdominal operation point of view worthy of mention. A slight ooze of blood came on the second day from the uterus, and continued to the eighth day. There was a good deal of pelvic pain at first, and several small doses of morphia had to be administered hypodermically. The history of the convalescence is as much that of a recovery from subacute bronchitis supervening on a chronic condition of the disease, as of an operation case. She was discharged three weeks after the operation.

On examination of the tumour (Fig. 3) before incision into it, it was found that the ovary (Fig. 3, 1) attached to it was quite separate and distinct, complete, and apparently normal. The external covering of the tumour was evidently the modified Fallopian tube, and at no point could it be made out that rupture had occurred. At the point where it had been torn by the volsella, the tumour appeared to consist of placenta, covered by the unruptured Fallopian tube. There could not, however, be ascertained any trace of the fimbriated end of the tube. It seemed almost certain, from palpation, that the lower portion contained a small

fœtus, of which the head formed the lowest point of the tumour. On incision (Fig. 3, 3) this was found to be true. It can be seen, on examination of the tumour, that the lower portion consists of a distinctly-formed fœtus of about three months, the development of the individual points, not the bulk, being chiefly considered. Microscopic sections have been made at the upper end of the tumour in order to ascertain the relation of the placenta to the covering of the tumour; also about the middle of the tumour, showing the relation of the undistended portion of the Fallopian tube to the sac containing the fœtus, and at other points (Fig. 3, A, B, etc.), and the structure of the cyst wall is the same

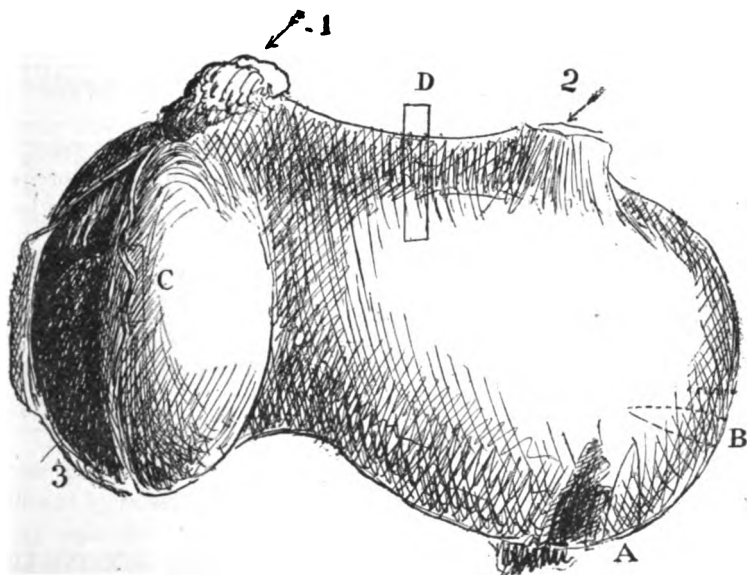


FIG. 3.

everywhere. The microscopic evidence is entirely against rupture having ever occurred. The point at which the hypertrophied but undistended portion of the tube was cut through is indicated by the number 2. The horizontal portion of the tumour measured $5\frac{1}{2}$ inches, the perpendicular part, from the cyst wall covering the fœtal skull to the upper point of the bend, $4\frac{1}{2}$ inches; the girth of the placental portion was $7\frac{1}{2}$ inches, and of the head portion $6\frac{1}{2}$ inches. There was no fluid in the tumour.

Remarks.—The illness, from which this patient suffered after “a miscarriage” seven years ago, was evidently the cause of the changes which had taken place in the left ovary. The patient’s memory could

not be trusted with any facts of the slightest value with regard to that illness. That it was not tubal pregnancy, and rupture, was proved by the state of the left tube.

As to the present illness, the first difficulty was with the history of menstruation and hæmorrhage in relation to it. The patient said she was regular until the hæmorrhage began in March. After many weeks of continuous loss of blood, there was complete cessation, which lasted the whole summer. But for Dr. Smith's examination, under an anæsthetic, we could not have learned that *the tumour existed at the time of the first hæmorrhage*. According to the patient there had been no previous amenorrhœa, and, in fact, no symptoms. The hæmorrhage appears to have come on after the ovum ceased to develop, and it was relieved largely by the rest in bed. There was some peritonitis, but it could not have been severe as it left only very slight adhesions, and if hæmorrhage into the pelvis had occurred about 10 months before the operation, it would almost certainly have left very marked effects.

The later hæmorrhages must be counted as ovarian metrorrhagia; they came on when the patient got up and tried to do any household work, and they ceased after she took to bed. The pain appears to have been largely due to pressure.

It will be seen that there is an entire absence in this case of the ordinary facts, as supplied by the patient, which suggest tubal pregnancy, and the most remarkable feature of all is the blighting of an ovum at such an advanced stage of its development without rupture.

REMARKS ON THE TREATMENT OF SECONDARY HÆMORRHAGE FROM THE ARTERIES OF THE UPPER EXTREMITY, WITH ILLUSTRATIVE CASES.

By JOHN E. PLATT, M.S. (Lond.), F.R.C.S.,
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In the present paper I wish to record briefly four cases in which I have been called upon during the past few months to treat secondary hæmorrhage from the arteries of the upper extremity, and to call attention to a modification of the usual treatment which was twice adopted with excellent results. Three of the cases were examples of secondary hæmorrhage from wounds dividing the radial and ulnar arteries and the superficial palmar arch respectively, and the fourth was a case of hæmorrhage from ulceration into the brachial artery. It not

unfrequently happens that patients are brought to hospital with secondary hæmorrhage from wounded arteries, owing to the vessels not having been ligatured at the time of the original injury. If such a wound be aseptic, it is usually an easy matter to enlarge it and to secure both ends of the vessel, or to apply a ligature on each side of the puncture if the vessel be incompletely divided; but, if suppuration have taken place, the artery will probably be found in a sloughy condition—in a state of local suppurative arteritis—and its walls will then be too soft to hold a ligature.

Two of the cases can be dismissed very briefly: The first was a man who came to the Manchester Royal Infirmary on the 2nd of November, 1894, with a wound of the wrist dividing the ulnar artery, which had been inflicted ten days previously. Secondary hæmorrhage had occurred on two occasions. No suppuration had taken place, and the ends of the vessel were readily found and ligatured. The second case was a man who was admitted on December 18th, with a wound of the superficial palmar arch a fortnight old, from which there had twice been secondary hæmorrhage. This wound was also aseptic, and under an anæsthetic I enlarged it, and found a small puncture in the superficial palmar arch. I applied a ligature on each side of the puncture, and also ligatured one of the digital branches which arose close to it. Both these cases progressed favourably from the time of operation; there was no further hæmorrhage, and the wounds healed without suppuration.

The other two cases were examples of hæmorrhage from arteries in sloughy wounds, and the treatment I adopted was a modification of that usually advised.

The first of these cases was a young woman, aged 20, who, in the latter part of October, sustained a wound of the thumb, which was followed by enlargement and suppuration of one of the lymphatic glands lying near the termination of the brachial artery. The abscess was opened, but the patient was admitted into the Infirmary four days later on account of hæmorrhage having taken place from the abscess cavity. The hæmorrhage was not very profuse, but as it recurred on the following day I decided to place the patient under an anæsthetic, and explore the cavity. To my surprise I found that the bleeding came from a small branch of the brachial artery, which was opened by ulceration close to the main trunk. It was not possible to ligature the branch, and two silk ligatures were therefore placed on the main trunk, one on each side of the bleeding point. The wound was washed out with antiseptic lotion and a drainage tube inserted. I confess that I made a mistake in using silk ligatures: the wound being septic, the ligatures would also become septic, and would therefore have to cut through the vessel and come away before the wound could heal, during which process there

would be considerable danger of recurrence of the hæmorrhage. This was exactly what happened. For thirteen days after the operation all apparently progressed well, and I was in hopes that there would be no further trouble, but after that period the hæmorrhage returned, and it was necessary to adopt further measures. Plugging of the wound would have been useless, as would also have been ligature of the main trunk, for the collateral circulation, if free enough to prevent gangrene of the limb, would have caused a return of the hæmorrhage. It was, moreover, impossible to ligature the bleeding point again, for the walls of the vessel were too soft to hold a ligature. After careful consideration, therefore, I decided to open up the wound, to trace the artery upwards and downwards until perfectly healthy parts were reached, to remove the suppurating portion of the vessel, and, in order to prevent any further trouble from ligatures, to twist the divided ends. I consequently enlarged the wound and exposed the artery, which was in a sloughy condition, especially in the neighbourhood of the distal ligature, and having freed it removed the whole of the diseased vessel. This was a more formidable undertaking than I had anticipated, for I found it necessary to take away four inches of the vessel. The divided ends of the main trunk were twisted, as were also a few small branches which arose from it. From this time the patient made an uninterrupted recovery, the circulation in the distal part of the limb returned almost immediately, and the wound healed completely in about three weeks. The patient is now, four months after operation, perfectly well: the cicatrix is sound, and there is no interference with the usefulness of the limb. Two enlarged collateral vessels can be felt pulsating near the elbow, one near the external and the other near the internal condyle, but only a very faint pulse is perceptible in the radial artery.

The fourth case is that of a man who was admitted into the Infirmary on January 5th last. Ten days before admission he cut his wrist with a piece of glass; the radial artery was punctured but not completely divided. The bleeding is said to have lasted for five hours although pressure was applied. Hæmorrhage returned on the following day, again on the seventh day, and again on the day before admission. When he came to the Infirmary he was very anæmic, and owing to the great amount of local pressure which had been applied there was a large sloughy wound two inches long and one inch broad just above the wrist. It was impossible to secure the vessel satisfactorily in the midst of this slough, and I therefore decided to adopt the mode of procedure which had been adopted in the previous case. I cut down upon the vessel just above the wound and having divided it, twisted the upper end. Following the vessel downwards, a healthy portion was reached in the interval between the *extensor primi internodii* and *extensor secundi internodii*

pollicis, in which situation it was divided and the lower end twisted. From this time the man had no further trouble, although the healing of the wound took several weeks. The length of the vessel removed was 2½ in., and its walls were in a sloughy condition.

I think that this method of treatment is one which may, with advantage, be adopted in dealing with certain cases of hæmorrhage from sloughy arteries, especially in the upper extremity. In such cases it is useless to temporise; the bleeding is almost certain to recur sooner or later, and the longer we wait the more extensively will the artery be diseased. Ligature of the main trunk higher up the limb is almost sure to fail, for if the collateral circulation be free enough to prevent gangrene it will, in all probability, be free enough to cause recurrence of the hæmorrhage. Ligature of the softened vessel is difficult and unreliable. The best treatment appears to me to be ligature or torsion of healthy portions of vessel on each side of the bleeding point, and of the two I give preference to torsion, since it leaves no foreign body in the wound. The objection to this method, that it opens up further the planes of cellular tissue is, I think, far outweighed by the advantages; the wound being freely opened up, the greater part of the sloughy tissue can be removed, proper drainage can be provided, and suitable agents can be applied to excite healthy action. With regard to the case of the brachial artery, I venture to express the opinion that if prompt measures had not been taken to deal with the suppurating vessel, the case would have ended in amputation.

I have to thank Mr. Whitehead, Mr. Jones, and Mr. Southam, Surgeons to the Royal Infirmary, for permission to make use of these cases.

CHRONICLE.

Medicine.

HEKTOEN (LUNVIG). "Amyotrophic lateral sclerosis, with bulbar paralysis and degeneration in Goll's columns; a contribution to the pathology of the primary combined system diseases."—*The Journal of Nervous and Mental Diseases*, March, 1895.

THE author reports with great care an interesting case of amyotrophic lateral sclerosis, in which marked sensory symptoms developed during life.

Briefly stated, the clinical history was as follows :—When the patient was 62 years of age weakness and difficulty in walking appeared. Soon the arms and hands became weak and thin ; disturbances in deglutition, chewing, and articulation also appeared. Two years later the distinct symptoms of amyotrophic lateral sclerosis had developed. There was spastic paresis in the extremities, with increased reflexes, muscular atrophy, especially of the hand muscles, and reaction of degeneration. There were also bulbar symptoms—dysarthria, difficult deglutition, paresis of the tongue and muscles of mastication, etc. At a later date, three years after the onset of symptoms, there was anæsthesia in the extremities—partial in the legs and feet and in the left ulnar district, but well-nigh complete in the right ulnar area. The anæsthesia gradually disappeared two months afterwards. There was again “some loss of touch, pain, and temperature sensibility in the trunk and limbs” six months later. The symptoms increased. The transmission of painful impulses became delayed. Then sensation to pain and temperature became diminished in the face, and sensibility to touch, pain, and temperature in the limbs and trunk further diminished. Incontinence of fæces and urine developed. Shortly before death there was double sensation and marked delay in transmission of impulses, both from the face, trunk, and limbs. Death occurred four years and eight months after the first onset of motor symptoms.

The pathological examination revealed slight but distinct changes in the cortex of the central (motor) convolutions, and degeneration in the pyramidal tracts from the internal capsule downward. There was thus chronic degeneration in the so-called indirect motor neurons. Similar morbid changes were found in the direct motor neurons, *i.e.*, atrophy of marked extent in the bulbar nuclei and in the anterior horns of the spinal cord, degeneration in the bulbar nerves, in the anterior spinal nerve roots, and in the mixed spinal nerves, in the cauda, the median and ulnar nerves, and also atrophy of the muscles of the tongue, larynx, and pharynx. There were identical lesions, though of less extent, in the direct sensory neurons : *i.e.*, changes in the ganglion cells of the spinal ganglia, degeneration in the posterior spinal nerve roots, and in Goll's columns ; also changes in the trigeminus sensory roots, and the sensory part of the left trigeminus nerve. There were slight changes in the cells of Clarke's columns, but there was no degeneration in the direct cerebellar tracts.

The clinical history and report of the pathological conditions are very complete. A good review of previous literature is given, and the paper is illustrated by a number of coloured diagrams.

The case is a connecting link between two groups of diseases of the nervous system that have usually been regarded as separate and distinct,

namely, those in the motor segments, such as progressive spinal muscular atrophy and amyotrophic lateral sclerosis on the one hand, and tabes dorsalis (in which the sensory neurons are involved) on the other.

TAYLOR (J.). "Optic neuritis in its relation to intra-cranial tumour and trephining."—Reprint from the *Transactions from the Ophthalmological Society*, Vol. XIV.

THE fact that the optic neuritis associated with intra-cranial tumour, as a rule, subsides after trephining, was first pointed out by Mr. Victor Horsley. Taylor reports a number of cases bearing on this subject. Three cases are first recorded in which optic neuritis and other indications of brain tumour were present; in each case the tumour was removed by Mr. Horsley. The optic neuritis subsided and the discs became normal.

In a second group of three cases, presenting clinically the unequivocal symptoms of intra-cranial growth, all three were trephined, but *no tumour was removed*. In two of these cases a tumour was visible at the operation; in the other case no tumour was discovered. In two of the cases the neuritis disappeared completely, in a third it underwent marked diminution, and was still subsiding when the patient was last seen, though there was evidence that the tumour was growing.

Three other cases are reported in which the neuritis subsided after the operation. In the one case there was optic neuritis in the right eye. A cerebral tumour was removed from the left hemisphere; the neuritis subsided. The patient died some months afterwards, and the autopsy showed that there was a cystic condition of the brain at the place from which the tumour had been removed. In another case there was well-marked optic neuritis, with other signs of cerebral tumour. The skull was trephined and a cyst opened and drained. In six weeks the neuritis had disappeared. The drainage was continued for two years; finally a large tumour was partially removed. The remaining portion of tumour increased, and death occurred. An autopsy revealed a large tumour of the left cerebral hemisphere. This was almost a crucial case. The trephining and drainage of the cyst were followed by complete subsidence of the optic neuritis, and at no period during the remaining three years of the patient's life was there any return of the optic neuritis, though the tumour growth was still present in the brain. In this case, then, trephining and drainage of a cyst in the tumour were sufficient to cause the neuritis to disappear. In another case marked optic neuritis was present; a tumour was removed; the neuritis subsided, and though the tumour recurred, the optic neuritis did not. The author then refers

to two well-known and important facts with reference to optic neuritis : (1) A cerebral tumour of large size may be present without giving rise to optic neuritis ; (2) optic neuritis may exist without cerebral tumour.

Taylor's cases show that optic neuritis may disappear entirely after the removal of a cerebral tumour. Also in certain cases optic neuritis may subside without leaving any trace behind, after trephining has been performed, although the tumour has not been removed.

In the latter case Taylor believes that the subsidence of the optic neuritis is due to the relief of the inter-cranial pressure, and that in certain cases of brain tumour the pressure inside the skull is the effective agent in producing what is known as optic neuritis.

R. T. Williamson.

PIC (ADRIEN). "Contribution à l'étude du cancer primitif du duodénum."—*Revue de Médecine*, Dec., 1894 ; Jan., 1895.

THE author, after a careful study of the clinical and pathological features of primary duodenal cancer, illustrated by references to a number of cases, arrives at the following conclusions :—

Primary cancer of the duodenum, like primary cancer of the intestinal tract generally, has, in the large majority of cases, an annular form, and thus most frequently produces stenosis. The stenotic symptoms vary according to the level at which the growth occurs. In *cancer sus-vatérien (para-pylorique)* the formation develops in the first portion of the duodenum, and presents a symptomatology almost identical to that of pyloric cancer. In *cancer sous-vatérien (præ-jéjunale)* besides the symptoms accompanying stenosis of the pylorus, there are signs indicating a reflux of bile and pancreatic juice into the stomach. In *cancer péri-vatérien* the symptoms approach more or less to one or the other of the above forms.

Among the *cancers peri-ampullaires* the author groups not only the cancers of the duodenum which affect the ampulla of Vater, but those also which are situated in the neighbourhood, and those which in their development involve the ampulla. Some of these cannot be distinguished clinically from the ordinary examples of duodenal cancer, but some may be distinguished by evidences resembling pancreatic carcinoma.

Pathologically, these growths usually present narrowing or contraction of the gut at the level of the cancer, with dilatation above it, sometimes involving the stomach itself, and frequently accompanied by insufficiency of the pyloric valve.

Histologically, there appear to be as many varieties of cancer of the duodenum as there are different kinds of cells entering into the formation of this segment of the digestive tract.

In diagnosis the difficulty varies according to the position of the new growth. In the form immediately beyond the pylorus it is usually impossible, but in the other situations it is sometimes possible. Primary duodenal cancer has to be differentiated from supra-duodenal, or pyloric, and infra-duodenal stenosis, and those conditions of constriction dependent on extrinsic causes, such as compression by surrounding structures.

The topographical diagnosis is of the greatest importance from the point of view of operative interference, which differs according to the seat of the growth in the duodenum. But when the diagnosis is impossible, exploratory laparotomy constitutes the first measure necessary for surgical intervention, which, however, in the greater number of instances cannot be more than palliative.

T. N. Kelynack.

Surgery.

KEEN (W. W.). "Operation wounds of the thoracic duct in the neck, with a résumé of the two prior recorded cases and two additional cases."—Read before the Philadelphia Academy of Surgery, April, 1894.

Two cases only of operation wounds of the thoracic duct in the neck have been recorded prior to Professor Keen's paper.

I.—Cheever's case (in the *Boston Medical and Surgical Journal* for 1875). During the removal of a tumour of the neck, a transparent, viscid, coagulable and colourless fluid was observed to well up from the lower corner of the wound in quantities as large as an ounce at a time. After the operation a smaller quantity of fluid continued to ooze. On examining the wound after death, which occurred in 36 hours, the source of the effusion could not be traced, but there was little doubt that it came from the thoracic duct or a large lymph trunk adjacent. The clearness of the fluid was probably due to the patient's abstinence from food for twelve hours before operation.

II.—Boegehold's case (recorded in *Archiv für klin. Chirurg.*, 1893). In 1880, Wilms, in removing a carcinomatous tumour from the neck, was scraping with a sharp spoon the tissues near the junction of the sub-clavian and jugular veins, when "suddenly there poured out over the operation field a stream of whitish fluid, the diameter of a straw." The operation was at once abandoned, and the wound packed. The packing

was removed next day without any further appearance of chyle. The patient recovered without incident, and died in six months from pulmonary metastasis of the carcinoma.

Of the two cases recorded here for the first time, one was communicated to Professor Keen by Dr. Phelps, of New York. After an operation, in which three inches of the jugular vein, close to its junction with the subclavian, had been removed, there was a constant profuse discharge from the wound, amounting to three pints daily, of a milky fluid. This continued for a week, and the patient lost flesh rapidly. The fluid issued from a single point in the wound, and the discharge could be stopped by the insertion of a probe at this spot. The point was accordingly caught by forceps, which were allowed to remain in place three days. The patient gained a pound a day in weight after the discharge was stopped, and made an excellent recovery.

The fourth case occurred in Professor Keen's practice. During the removal of a large mass of tubercular glands from the left supra-clavicular region—whilst separating adhesions with a blunt dissector—Professor Keen opened a tube about one-eighth of an inch in diameter, from which welled out a clear fluid, which flowed continuously but with a marked respiratory rhythm. The fluid coagulated in a few minutes. About two ounces escaped altogether. Digital pressure on the opening was made until the removal of the glands was completed, and the wound in the duct was then sewn up by means of a very small curved needle and fine silk. Some little leakage still occurred. A drainage tube was inserted for five hours, during which time a pint of clear fluid, mixed with a small quantity of blood, escaped. The dressing next day contained an ounce or two of a similar fluid, after which it remained dry, and the patient was able to go home on the eighth day.

In his remarks, Professor Keen notes that the thoracic duct frequently breaks up into several ducts before its point of termination, and thinks that in all these cases one of such branches, and not the main trunk, may have been injured. It must also be remembered that the height of the terminal curve which the duct makes in the neck varies very considerably. As to the nature of the fluid—in two of the cases—from its milky colour, it was evidently chyle. The clearness of the fluid in Keen's case may be accounted for, in his opinion, by the fact that the patient had taken no food for eighteen hours previous to the operation. The author thinks that, wherever feasible, the wound in the duct should be sutured, the result of this treatment in his case having been most satisfactory.

An account of Boegehold's experiments, by wounding the thoracic duct in dogs, is also given—the general conclusion being that the complete integrity of the duct for the support of life is not absolutely

necessary. In a number of instances the duct has been completely obliterated without symptoms, collateral circulation having been established.

If the duct is wounded or ruptured in the thorax the immediate danger results from the accumulation of chyle in the pleural cavity. In a case of Kirchner's—where a girl of nine was pushed violently against a window-sill and injured at the level of the third rib—the right pleural cavity became distended with fluid in the course of a fortnight, the liver being pushed downwards and the heart displaced to the left. Two pints of chylous fluid were removed by aspiration, and complete recovery ultimately occurred. Kirchner has collected 16 cases of injury to the duct in the thorax and abdomen, including some doubtful cases, six resulting in chylous ascites, nine in chylo-thorax, and one in "hydrops lacteus," from the collection of lymph in the mediastinum. The four cases here reported are the only ones in which the thoracic duct has been injured in the neck.

POWER (D'ARCY). "Cases to illustrate the relationship which exists between wry-neck and congenital hæmatoma of the sterno-mastoid muscle."—Reprinted from the *Medico-Chirurgical Transactions*, Vol. LXXVI.

AFTER a comprehensive review of the previous literature of this subject, Mr. Power gives notes of fifteen cases, observed by himself, Mr. Willett, and Mr. Clutton. Of 106 recorded cases of hæmatoma of the sterno-mastoid muscle, in 20 death occurred too soon for wry-neck to have become apparent; in 47 wry-neck was looked for, but not found; and in 23 cases wry-neck occurred, but in 4 of these it was so slight and transient as to be unimportant. The cases observed by the surgeons just named number 30, of which 11 eventually developed wry-neck, but in 2 of the 11 cases the torticollis was so slight that it was hardly worth while taking it into account, whilst in 4 cases it was necessary to divide the tendon. Mr. Power draws the following conclusions:—

(1) Hæmatoma of the sterno-mastoid muscle may be due to intra-uterine injuries, which are rare, or to injuries at the time of birth, which are common.

(2) Congenital hæmatoma of the sterno-mastoid muscle occasionally predisposes to wry-neck in children who are otherwise healthy.

(3) Wry-neck thus caused varies in degree from the slightest and most transient form to one of such severity as to require tenotomy of the muscle for its cure. The wry-neck is not—so far as I have seen—accompanied by asymmetry of the face.

(4) Every child who has the misfortune to be injured in this manner must be carefully watched for a much longer period of time than is usually considered necessary to obviate any tendency to the formation of a wry-neck.

(5) Surgeons should give more prolonged attention to children affected with hæmatoma of the sterno-mastoid muscle, to enable them to determine still more accurately what are the ultimate and usual effects of the injury.

J. W. Smith.

VON SCHAICK. "Insomnia in surgery, and its treatment."—*New York Medical Journal*, March 2, 1895.

THE author classifies the causes of the insomnia met with in general surgery as follows:—(1) Nervousness due to fear of operation. (2) Depreciated nervous conditions due to exhausting diseases and to pain. (3) Post-operative nervous influences. (4) The influence of certain special surgical diseases. (5) Complicating pathological nervous disorders.

He thinks enough attention is not paid to the nervous dread of operation, believing it produces sleeplessness before the operation, with the result that the patient takes the anæsthetic badly, and suffers more severely from shock after the operation.

He considers it wise to give a hypnotic in every case where this fear of operation exists, and thus make sure of sleep. He prefers to give trional in 15 grain doses, repeated, if necessary, unless pain is the cause of the insomnia. Even where pain is present in cases of long-continued exhausting diseases, the writer has often found trional have the happiest effects. He believes such patients, habituated as it were to the pain, can often sleep if the accompanying restlessness and nervousness can be quieted.

Similarly, trional has a good effect in cases of insomnia and restlessness due to post-operative nervous influences, perhaps the expression of a relaxation of nerves highly strung by fear or suffering.

Insomnia, restlessness, and jactitation are frequently observed after urethrotomies or other operations on the genito-urinary tract, quite independent of the so-called urethral fever. The author, in the more serious operations on the urethra or bladder, commonly gives an injection of morphine in the morning, half an hour before anæsthesia. This keeps the patient quiet during the day; and he orders 20 or 30 grains of trional at night. Abdominal sections, in which thirst is apt to complicate the other nervous disturbances, are also very frequently followed by insomnia of more or less severe type, and the author has found trional given by the rectum to act successfully in such cases.

In conclusion, the writer urges that in the insomnia of surgical disorders trional is a powerful and safe hypnotic, with no inhibitory action on the secretions, well borne by the stomach, easily absorbed by the rectum, and free from unpleasant after-effects.

DEPAGE. "Chirurgie du foie."—Reprint from *Annales de la Société belge de Chirurgie*, Nos. 8 and 9.

THE author gives an account of two successful operations. In the first case a child eight years old suffered from hydatids of the liver, a comparatively rare affection in the young. There was a history of a year's duration of a tumour in the abdomen on the right side, gradually increasing in size.

On examination a swelling about the size of a boy's head was felt on the right side. It was rounded, not nodular, slightly fluctuant. The lower border of the liver could be felt, and seemed to be spread out on the tumour. The tumour followed the respiratory movements. Dulness from sixth rib to a finger's breadth above anterior superior spine of ilium. Spleen normal, and general condition satisfactory. An operation was performed, a vertical incision 3 cm. long being made over the most prominent part of the tumour. The cyst was punctured, and about a litre of characteristic limpid fluid evacuated. The wall of the cyst was then stitched to the abdominal wall, and in order to prevent any of the fluid getting into the abdominal cavity a pair of Pean's forceps were fixed so as to close the puncture in the cyst wall for two days, after which the forceps were removed and the fluid allowed to flow freely, the wound being washed with 1:2,000 perchloride lotion, and dressings kept applied.

Six days later there was a spontaneous elimination of all the inner coat of the cyst, and the wound then healed, leaving a small sinus. Examination of the fluid showed the presence of the echinococcus, and absence of albumen.

The second case was one of obstruction of the cystic duct by a calculus in a woman 51 years of age. The liver was enlarged, and the diagnosis was doubtful between cancer of the liver and gall stones, so it was ultimately decided to make an exploratory incision. When the peritoneum was opened the omentum was found very adherent, the gall bladder was enlarged and adherent to the transverse colon. The liver appeared normal, and there was no cancer. Another incision made transverse to the first allowed access to the gall bladder, when a stone was discovered in the gall bladder and a second enclosed at the level of the neck. Cholecystectomy was performed, but the dissection was tedious and difficult. A catgut ligature was placed on the cystic duct, which was finally divided.

The wound was packed with iodoform gauze and dressed. Everything went on well, the wound being completely healed at the end of 15 days. The extirpated gall bladder had very thick walls, and contained a cholesterine calculus, and about 20 grammes of mucous fluid. At the level of the neck a second cholesterine calculus was found, enclosed in a dilatation communicating with the cavity of the gall bladder by a very narrow opening. The author thinks that in cases of doubtful diagnosis one should not hesitate to open the abdomen, and be assured by sight of the nature of the illness.

DEPAGE. "Tumeurs malignes du sein.—Pseudo-maladie de Paget."—

Reprint from *Annales de la Société belge de Chirurgie*.

THE author refers to a case of an affection of the breast analogous to Paget's disease in its clinical characters, but histologically differing entirely from that disease. Dr. Depage believes that many cases have been recorded as Paget's disease which were not so really.

In his own case, a woman, 62 years of age, who had had an abscess of the breast incised 35 years before, came under observation with an affection of the right breast of more than a year's duration. There was an ulcerous surface 15cm. long by 9cm. broad, intensely red at the periphery, white and dry in the centre. At the level of the nipple (which had entirely disappeared some months earlier) there was a hollow, filled up with a dry caseous substance. To the touch the surface of the ulcer was hardened and papyraceous. The edges were clearly circular, appearing formed of arcs of circles of different radius; there was no inflammatory areola. The ulcerated portion was not adherent to the deeper parts, moving freely over the underlying adipose tissue. In the surrounding healthy skin small hard nodules were found. The diagnosis was made of Paget's disease with probably cancerous metastasis, and ablation of the breast was performed, infiltration of the axilla being found. Microscopic examinations were made of fragments from the site of the ulceration, from the border of the ulcer, and from the glandular portion of the breast. At the site of the ulceration cancerous nodules of cubical epithelial cells were found embedded in a fibrous stroma. They presented histologically the character of glandular cancer. The epidermis had completely disappeared, also the Malpighian layer; neither sebaceous glands nor hair follicles could be made out. At the periphery of the ulcer at the level of the non-ulcerated skin, the horny layer and Malpighian layer were normal. In the true skin the sebaceous glands and hair follicles showed their normal structure. The sweat glands showed evidence of cancerous proliferation, becoming more marked nearer the ulcerated surface. The mammary gland itself showed the ordinary lesions of cancer of that organ.

Dr. Depage considers that histological examination proves that the initial site of the lesion was not the epidermis, but that the original process was of a cancerous nature, involving on the one hand the mammary gland and on the other the sweat glands. He thinks one might say that this was a case of a glandular cancer springing from the nipple, penetrating into the mammary gland by following the galactophorous vessels, and spreading on the surface by invading the sweat glands.

From the practical point of view of prognosis the author believes this to be of importance, as the prognosis of Paget's disease is by no means so gloomy as that of cancer of the breast, for the former usually exhibits a slower evolution and a much later development of secondary growths.

GOULD. "Some unusual cases in the surgery of the breast."—*Practitioner*, April, 1895.

THE author draws attention to four recent cases, illustrating some rather unusual conditions in regard to surgical diseases of the breast and presenting some interesting points.

In the first case a woman, aged 35, and the mother of four children, was the subject of an adenoma of the right breast, which had been in existence for over a year. When she first came under observation she was in the eighth month of pregnancy, with a tumour the size of a melon in the right breast, which had been growing rapidly for four months.

Mr. Gould removed the tumour, which weighed 33oz., and microscopically proved to be a pure glandular tumour—adenoma.

This case is interesting from the effect of the physiological activity of the mamma in increasing the rapidity of the growth of the tumour, and also as regards the advisability of operation during pregnancy. If it had been decided to wait, the operation could not have been performed at the earliest till one month after the birth of the child. In the meantime the tumour would have increased in size, perhaps very much, under the more intense stimulus of lactation. Then, again, operation on the breast during lactation is to be avoided if possible, owing to the risk of acute mastitis or arrest of function. The course decided on was justified by the happy result of the case.

The second case was of a single woman, 58 years of age, who had scirrhus of both breasts. The tumour in the left breast was about the size of a hen's egg, and that in the right breast about the size of a pigeon's egg. The patient discovered the lump in the left breast eight months before her admission to hospital, the other being observed only one month before admission.

Mr. Gould excised both breasts at one operation, the patient making a good recovery. Both growths proved to be examples of very cellular scirrhus carcinoma.

The third case, a woman 56 years of age, and the mother of four children, suffered from chronic or atrophic scirrhus of the right breast. There was a five years' history, growth having been very slow. The breast was removed along with the pectoral fascia and the axillary fat and glands, the latter being markedly implicated.

The fourth case, a woman aged 54, the mother of seven children, presented an example of scirrhus of an outlying axillary lobule of the mamma and of the axillary and supra-clavicular glands. The history extended over nearly two years.

Notwithstanding the extension to the supra-clavicular glands, Mr. Gould decided to remove the growth along with the diseased glands. Microscopically the tumour proved to be scirrhus cancer.

Mr. Gould makes some remarks in regard to these cases of scirrhus, which are departures from the ordinary type, whilst the operations performed infringed some well-established surgical canons. In the case of scirrhus of both breasts, some authorities lay down the rule that no operation should be attempted, and when one tumour is distinctly secondary to the other this holds good. But, in the case described, the absence of all visceral infection and all signs of secondary growths seemed to point to both tumours being primary.

As regards the question of removing both breasts simultaneously, as opposed to removal by two successive operations, Mr. Gould is of opinion that in these days of almost bloodless and aseptic surgery, the double operation does not add materially to the danger.

In the case of atrophic scirrhus, Mr. Gould believes that the modern operation of wide removal of all diseased parts and thorough cleaning out of the axilla, justifies interference even though the growth has been very slow. In fact, probably the most chronic forms of the disease will yield the best results.

In the fourth case, two surgical rules were infringed: first, in operating at all when the supra-clavicular glands were infected; and second, in excising the tumour without removing the entire breast. In this case the disease in the glands seemed very limited, and the glands were not fixed and easily removable, therefore Mr. Gould thought the operation justifiable. In regard to the propriety or otherwise of leaving the mamma, a similar case in which he left the main mass of the mamma showed no recurrence in the breast three years and a quarter after the operation, but only a small nodule in the scar near the axilla.

Francis J. H. Coultts.

Midwifery and Diseases of Women.

DUDLEY : New York. "My experience with the immediate repair of uterine injury following labour."—*American Journal of Obstetrics*, February, 1895.

DR. DUDLEY discusses the question of immediate suture of laceration of the cervix following labour. He strongly recommends that a cervical tear should be sewn up.

Deep lacerations of the cervix frequently result in tearing across of the circular artery, and so cause profuse hæmorrhage, which may continue even after the uterus is firmly contracted. After a time the bleeding may cease spontaneously, but blood clots are formed in the cervical canal which readily decompose, thus rendering the patient very liable to septicæmia.

He draws attention also to the remote pathological lesions which follow ununited cervical injuries, and considers that there is much less risk to the woman from the manipulations necessary in immediate repair, than if the tear be left to nature.

In his own practice he carefully examines the cervix in every case. If a tear is found he passes a Sim's speculum, draws down the cervix with forceps, and inserts catgut sutures with an Emmet's cervix needle. He usually administers a little chloroform; but if assistance is not available, he applies cocaine locally, to relieve the pain, which, however, is usually slight.

Since 1889, Dr. Dudley has sutured the cervix immediately in twenty-one cases, and he gives details of five of these. In those quoted, the tear extended up to the vaginal junction, and was bilateral. Perfect union was obtained in all the cases.

DAVIS : Philadelphia. "When shall coeliotomy be performed in the treatment of puerperal sepsis?"—*American Journal of Obstetrics*, February, 1895.

COELIOTOMY should not be thought of in puerperal sepsis until that portion of the genital tract which can be reached through the vagina has been rendered thoroughly aseptic.

For this purpose the intra-uterine douche curette should be preferred.

If, however, after this there is no amelioration of the symptoms, the patient should be examined under an anæsthetic. If a focus of infection

can be made out, such as an abscess in Douglas' pouch, tubal or ovarian abscess, or an enlarged infected uterus, coeliotomy, either through the vagina or through the anterior abdominal wall, should be performed. In cases where the uterus is infiltrated, or the tubes and ovaries diseased, vaginal or abdominal hysterectomy should be done.

In a certain number of cases of acute infection of the general peritoneum, and in which the patient's general condition is sufficiently good, coeliotomy, if performed early, offers a chance of relief.

Dr. Davis gives details of five cases of puerperal infection.

In Case 1 the patient remained feverish and ill a fortnight after confinement; no definite focus of infection could be found, but the uterus was large and soft; the abdomen was opened, and multiple abscesses could be seen beneath the peritoneal covering of the uterus. Hysterectomy was performed, and the stump treated by the extra-peritoneal method. A good recovery ensued.

The next three cases had general peritoneal infection: coeliotomy with drainage was performed in all. One case recovered, and in this patient the infection was in a very early stage.

In the fifth case, in which criminal abortion had been practised, death occurred from rupture of an abscess in Douglas' pouch into the peritoneal cavity, which happened before the patient was brought to the hospital. In this case vaginal opening and drainage of the abscess was indicated, but the patient's condition did not justify any operative interference.

Arnold W. W. Lea.

FREES. "The operative treatment of tubercular ascites."—*Deutsche med. Wochenschrift*, November, 1894.

THIS paper gives an account of the cases treated by Löhlein at the Hospital for Women at Giessen. The cases of tubercular peritonitis treated by abdominal section numbered eighteen. In all there was a certain amount of ascites, the fluid varying in quantity from 1½ to over 20 pints. The fluid was clear in every case, hæmorrhage never having occurred at any time. The parietal and visceral peritoneum were in every case covered with small tubercular nodules, the character of which was proved by histological examination and by the presence of tubercular disease in other organs of the body. Tubercle bacilli could very seldom be made out. The nodules of the peritoneum were by far the most numerous in the pelvis, and especially in Douglas' space, a fact of which the explanation offered is that it depends upon the precipitation of the tubercular material from more highly situated portions of the peritoneum. In two cases the disease probably originated in the Fallopian tubes. In three cases the disease without doubt originally affected the internal

sexual organs. The ages of the patients varied from 13 to 60 years. The operation consisted in making a small incision in the middle line so as to permit the fluid to gradually flow away, and that which remained in the pelvis was as a rule swabbed out. In a few cases drainage was employed for the first few days, but no marked difference was observed between the cases which were drained and those which were not. There is no mention of flushing of the peritoneal cavity.

As to the results, no case proved fatal from the operation alone; six out of the 18 remained permanently cured.

An explanation of the process of healing is offered. Such an explanation is yet purely a matter of theory—almost of speculation—as it is not supported by observation or experiment.

BINAUD. "Tubercular meningitis following extirpation of tubercular pyosalpinx of both sides."—*Gazette Med. de Paris*, 1894, No. 27.

THE author refers to the statistics of forty-one operations in tubercular disease of the uterine appendages, and sets down the prognosis as much more unfavourable than it is usually believed to be. Four patients died as the immediate result of the operation, and nearly all the others died from general tuberculosis, tubercular peritonitis, or tubercle of the lungs. The case contributed by Binaud has several interesting features. A domestic servant, twenty-six years of age, previously healthy, became suddenly ill, suffering without apparent cause from abdominal pain, headache, and feverish symptoms, which were attributed by the medical man who was consulted to an attack of influenza, and the case was treated accordingly. Menstruation came on soon after the beginning of the attack, and in little more than a fortnight the patient was able to be about again, but she was still suffering and unfit for work. The abdominal pain continued, and menstruation did not return. In course of time she observed that some abdominal swelling had appeared, and she sought admission to the hospital. The patient was found to be emaciated, the abdomen was distended and painful, and there was a tumour in the left hypogastrium as large as a child's head, painful, fluctuating, and movable. The uterus was normal, with the exception of being slightly raised in position. It was ultimately found that there were two tumours, the larger one being on the left side. The right, being somewhat less, had been overlooked on the first examination. Abdominal section was performed about four months after the onset of the illness, and it was found that the tumours consisted of purulent collections in the Fallopian tubes. The cysts were punctured and the fluid drawn off by aspiration, and then the sacs were removed, some

small portions of the left being so adherent to the intestine that it was considered advisable to leave them rather than forcibly break down the adhesions. A drainage tube was introduced, and the wound healed without complication.

Twenty-five days after the operation, symptoms of tubercular meningitis set in, and in five days the patient became comatose, and died at the end of ten days. Post-mortem examination revealed no trace of peritonitis, with the exception of some tubercular granulations in an adhesion between the omentum and abdominal wall. The other abdominal organs were entirely free from tubercle. There was no tubercle in the lungs, but there was turbid exudation into the ventricles of the brain, and tubercle invaded the vessels at the base. The tubercular meningitis appears to have come on after removal of the tubercular appendages, just as tubercular affections may affect other organs after similar operations. As to treatment, such occurrences do not so much suggest non-interference with tubercular peritonitis, or tubercle of the internal sexual organs, as call attention to the necessity for early operation.

W. J. Sinclair.

Pharmacology and Therapeutics.

FRASER (T. R.). "The remedies employed in cardiac affections and their indications."—*Edinburgh Medical Journal*, April, 1895.

A DISCUSSION on cardiac therapeutics at the Medico-Chirurgical Society of Edinburgh was opened by this paper, which contains many valuable and interesting observations on substances used as cardiac tonics. Three illustrations are first given of the beneficial effect on the heart and kidneys which strophanthus exerts in mitral and mitral-tricuspid lesions. The drug was given in doses of six to eight minims of the tincture, and the tracings show a marked rise in arterial tension in a very short time after the administration of strophanthus. In one case the drug seems to have been persevered with for several months, and no troublesome effects are recorded from its prolonged administration. The author points out that the direct and uncomplicated effects of mitral stenosis are not as much benefited by cardiac tonics like strophanthus as those of insufficiency.

In aortic disease evil may be done by a cardiac tonic, especially if it be one like digitalis, which contracts the vessels. Sometimes, however, even when aortic lesions are present, strophanthus is found of great

service, when compensation has not been established, and tracings are shown of cases in which strophanthus did good service when both aortic and mitral lesions were present. Angina pectoris, which often occurs when the cardiac muscle is hypertrophied under the influence of aortic disease long before asystole takes place, does not call for the administration of cardiac tonics. In the absence of the evidence of non-compensation it is best treated by opium, nitrites, and iodide of potassium. Opium is the most certain. The nitrites are of great value when the heart symptoms are aggravated by bronchial spasm. In angina they occasionally fail to give relief. Their value in this ailment is usually attributed to their vessel-dilating influence, but Professor Fraser says he has observed angina occur while the arterial tension remained low, and has seen nitrites succeed where no obvious effect was produced on the circulation, and fail where tension was greatly reduced by them. With regard to iodide of potassium, he remarks that we are unable to explain its beneficial action by its effects on the circulation. In large doses it quickens and enfeebles the heart's contractions, but at the same time renders them irregular. The blood vessels do not seem to be affected by weak or strong solutions transfused through them.

In cardiac insufficiency without valvular lesion due to changes in the myocardium great advantage may be derived from strophanthus, and the drug may even do good where there is fibroid degeneration of the myocardium.

In the low tension accompanying pneumonia Professor Fraser says the tension may be raised by strophanthus, and he gives two illustrations of this. In one, however, the rising tension was coincident with the first evidences of the termination of pyrexia, and even in the second it was associated with a distinct fall in temperature. Professor Fraser draws special attention to the diuresis which strophanthus causes in cardiac disease. In pleurisy he uses it not only to restore the normal condition of the weak, dicrotic pulse, but to lessen the likelihood of the recurrence of pleuritic effusions after thoracentesis has been performed by the stimulation of the kidney secretion.

Failure of cardiac tonics is to be expected (1) when the degeneration of the myocardium is so far advanced that adequate contraction of the heart cannot be originated; (2) in mechanical obstruction of the circulation caused by valve leakage, or stenosis so extreme that no possible increase in the strength of the heart's contractions can produce a sufficient circulation of blood; (3) in a combination of degeneration and of mechanical effects of valve lesions, where each separately would be insufficient to cause failure, but where the combination is sufficient to do so. Of course conditions outside the heart, as lung oedema, bronchitis, and pleuritic effusions will also cause its failure.

Comparing the influence of various cardiac tonics the author states that of all strophanthus acts most powerfully on the cardiac muscle. A solution of one part of dry alcoholic extract in ten million parts of liquid perfused through the living heart of a frog causes paralysis in extreme systolic contraction in about fifty minutes. The most active of the soluble principles of digitalis has but little effect in a solution of one in fifty thousand, while even a solution of one in five thousand is not able to exert on the cardiac muscle so strong an action as one in ten million of strophanthus extract. On the other hand the most active of the soluble principles of digitalis exerts at least fifty times greater contractile power upon blood vessels than extract of strophanthus or strophanthin. Professor Fraser has not found strophanthus fail on this account as a diuretic, though such failure is possible in some cases. He points out that at times cardiac tonics will not succeed unless a vessel dilator is at the same time administered, and records a case of mitral disease with dropsy where tincture of strophanthus given for seven days failed to increase the quantity of urine above 40oz., but when half-grain doses of sodium nitrite were added, diuresis commenced on the second day and became profuse. It should always be remembered that no remarkable diuresis is to be expected from cardiac tonics in the absence of cardiac insufficiency.

With regard to other cardiac tonics, it is pointed out that strophanthus extract is found to be eight times more powerful than adonidin, scillitoxin, and erythrophlein, 20 times more powerful than helleborein, 30 times more powerful than convallamarin, 300 times more powerful than some specimens of digitalin, 3,000 times more powerful than others, and 30,000 times more powerful than caffeine. Spartein slows the heart rather by weakening its systole and thus delaying the cardiac contractions than by increasing the strength of the contractions. It has no direct action on the myocardium, but only on its regulating nerves, and this can only be produced by large doses.

D. J. Leech.

SANSOM. "The treatment of nervous disturbances of the heart resulting from influenza."—*Practitioner*, April, 1895.

IN the early acute stage of influenza, the author gives sulpho-carbolate of sodium in somewhat large doses, and insists on rest in bed, even in slight cases. If the temperature rise above 103° F., the author gives quinine in 5gr. doses. Phenacetin or antipyrin may be given, but require watching. If antipyretics fail to reduce the temperature, "there is probably a dangerous or fatal cerebro-spinal involvement."

IN profound adynamia, he considers musk the most efficient stimulant. Hypodermic injections of brandy and ether, or of strychnine

($\frac{1}{80}$ — $\frac{1}{50}$ gr.), may be required occasionally. After the acute symptoms have subsided, Dr. Sansom continues the sulpho-carbolate of sodium, with the addition of 3 to 5 minims liquor arsenicalis. He also treats the naso-pharyngeal mucous membrane, using: Camphor and menthol, of each 20 grains; pure carbolic acid, $\frac{1}{2}$ drachm; parolein (B., W., & Co.), 4 ounces; or cocaine and menthol, dissolved in olive oil.

The signs and symptoms referred to the heart, resulting from influenza, were thus distributed in 100 cases:—Pain, referred to the heart, 23 cases; rapid heart, 37 cases; irregular heart, 25 cases; slow heart, 5 cases; organic heart disease, 10 cases. Dr. Sansom thinks organic disease of the heart very rare as a sequence of influenza, but he thinks "the specific poison alarmingly reinforces pre-existing rheumatic disease."

Disturbances of the nervous mechanism of the heart frequently follow influenza, and the author believes these disorders originate in induced morbid conditions of the medulla oblongata, the nerve elements of the cord, and the sensorium. In severe heart pain, after influenza, complete rest should be advised at first. A hypodermic injection of morphia may be given, but a stimulant should be administered previously by the mouth. The author suggests the following:—

R. Spiritus ætheris.....	℥dr.
Sp. ammon. co.	℥dr.
Tinct. sumbul.....	℥dr.
Aq. camphoræ	1℥oz.

Afterwards, quinine, in 5gr. doses, dissolved in hydrobromic acid, is very effectual. Small doses are of no use. Bromide of sodium, 20grs., with 3 minims of Fowler's solution, may be given advantageously. Local treatment is valuable. Mustard poultices, sprinkled with laudanum, belladonna, or aconite, give relief in some cases. Blisters, and the constant current, have also been successful in removing the pain.

Tachycardia may be manifested some months after the initial attack of influenza. In some cases, palpitation is very severe, and in a large number of cases there are some of the associated signs of Graves' disease. In the treatment of these cases, Dr. Sansom believes digitalis, and similar cardiac tonics, to be not only useless but dangerous. The mixture of sodium bromide and arsenic is the most generally useful. During periods of dyspepsia, alkaline bicarbonates, with bismuth and small doses of dilute hydrocyanic acid, seem to be best.

For insomnia, chloralamide in 20 to 25gr. doses at bedtime. If unsuccessful, try sulphonal, and only use opium as a last resort. In cases of rapid heart continuing for a long time the constant current is a valuable adjunct to treatment.

The irregular heart has associations similar to those of the rapid heart. It is more frequently attended with cardiac pain and discomfort, and is more common in persons of advanced age and gouty tendencies. The treatment is similar to that for pain at the heart and tachycardia.

Bradycardia, where there is slowing of the pulse during recurrent attacks of severe epigastric and abdominal pain, may be treated successfully by phenacetin and camphor, with local warmth and counter-irritation of the abdomen. Dr. Sansom considers a more permanent bradycardia very serious. The only drug he has found of any use is belladonna. Massage and graduated exercise are useful.

HEWLETT. "The antitoxin treatment of tetanus."—*Practitioner*, April, 1895.

THE author gives some statistics showing the reduction in the number of cases of tetanus since the use of antiseptics in wound treatment became general. He refers to the varied methods of treatment that have been adopted with but doubtful success. On experimental grounds he considers the modern antitoxin treatment the most promising. He then mentions the subject of artificial immunity, and goes on to describe the method of preparing the tetanus antitoxin from the horse by injections of germ-free tetanus toxins in gradually increasing doses. The blood serum from the horse thus treated is termed the tetanus antitoxin. The dose given has varied from 5 or 6 cc. to 167 cc. The author recommends 20 to 40 cc. for the first dose, followed by 10 to 20 cc. every 6 or 12 hours. The serum must be administered by hypodermic injection. The syringe should have a capacity of at least 10 cc., to avoid multiple punctures. It should be boiled in water for ten minutes before using, to sterilise it, and all precautions should be taken to avoid sepsis. No disturbance ever ensues from the antitoxin except urticaria. In employing the antitoxin as a remedy it ought to be administered as soon as the onset of tetanus is probable. Any distinct sign, such as stiffness of the neck, difficulty in opening the mouth, or even any considerable pain at the seat of injury, coming on a few days after the accident without apparent cause, should lead us to use the remedy. If a favourable result is to be expected, it is imperative to employ the antitoxin as early as possible. As a prophylactic a small dose of antitoxin (5 cc.) would probably suffice. Of 50 cases treated with antitoxin 16 died, or 32 per cent, which is much less than the ordinary mortality from tetanus. Local treatment (nitrate of silver, 1:100 solution, and iodine 1 part, along with an equal weight of potassium iodide, in 100 of water) must not be omitted, and free excision of the

affected part should be practised. The patient should be placed in a darkened room, and perfect quietness enforced. Abundance of easily digested food should be administered, if necessary through a stomach tube during chloroform anæsthesia. Chloral may be given to induce sleep.

"Use of cerebral extract in the treatment of neurasthenia."—*Norsk Magazin*, March, 1895.

DR. H. J. VETLESER publishes four cases of neurasthenia treated by subcutaneous injection of a liquid extract of the grey substance of the brain, according to the method of Babés and Paul. This "cerebral liquid" was employed in doses of 3cc., injected three times a week and up to 12 consecutive times. In one patient the result of this treatment was insignificant. In two others improvement occurred, sleep was more tranquil, and the patient's energy increased. All the cases were chronic, had gone on for several years, and had been treated previously by all kinds of drugs.

"Therapeutic effects of beta-naphthol bismuth."—*New York Medical Journal*, March 30, 1895.

DR. HUGO ENGEL praises beta-naphthol bismuth, and describes several cases in which he used it with gratifying results. He believes it of value in all fermentative bowel complaints due to pathogenic bacteria, and says that "the more there is evidence of auto-intoxication, the more apparent and the more rapid will be the effect of the beta-naphthol bismuth." This drug is supposed to be decomposed in the intestines into bismuth and naphthol. It has been given in daily doses of 75 grains without any toxic symptoms, and is well borne by patients even when continued a long while. The author used 15 grain doses in adults, and 3 grain doses in very young infants. He considers it the most reliable intestinal disinfectant we possess.

"Caffeine in diseases of the respiratory organs."—*Practitioner*, April, 1895.

DR. E. MARKHAM SKERRITT strongly recommends the use of caffeine in some affections of the respiratory organs, and especially in spasmodic asthma. The drug acts in two ways: first, directly in producing relaxation of spasm, and secondly, indirectly by aiding the heart to overcome the obstruction in the pulmonary circulation. Dr. Skerritt does not think that the value of caffeine, in relieving the paroxysms of spasmodic asthma, is at all generally realised.

He has found it successful when drug after drug had been tried in vain. He prescribes the citrate of caffeine in the dose, for an adult, of 5 grains, taken in a *cachet* or in water. He thinks the effervescent hydrobromate of caffeine inconvenient, and has never administered caffeine hypodermically. In acute bronchitis, caffeine will often relieve the dyspnoea, and also in chronic bronchitis and emphysema. As the drug is a cardiac tonic, acting on the medulla and heart centres, it is of great service in acute respiratory troubles with threatening heart-failure. Some ill effects have been described by Lehmann, Pratt, and Routh, after doses varying from 8 grains to one drachm; but the author has never witnessed any untoward results. Occasionally a condition of wakefulness is induced, but it is described as pleasant, the patient feeling wide awake, mentally active, and free from any disagreeable sensations. As a rule, patients sleep without difficulty after their nightly dose of 5 or 10 grains, and no evil effect has been noted in cases where the administration of the drug has extended over long periods—sometimes even years.

"Choice and technique of hypodermic injections of quinine."—*Journal des Praticiens*, March 30, 1895.

Dr. KILSCH reports that all preparations of quinine employed hypodermically are open to objections. The sulphate dissolved in tartaric acid has caused soars or abscesses. The basic hydrobromate is better borne, but only dissolves in ten times its weight of water, and requires the addition of alcohol. The basic hydrochlorate is only moderately soluble, and the neutral hydrochlorate of quinine (Beurman and Villejean), soluble in double its weight of water, is the most advantageous: Neutral hydrochlorate of quinine 5 grams, distilled water to make 10 cubic centimetres. Each cubic centimetre of the solution contains half a gram of the hydrochlorate; the solution keeps well, and injected under the skin it is well borne. Some of the ill effects attributed to quinine solutions are due to want of antiseptic precautions. Others depend not on the drug nor on the doctor, but on the cachectic and exhausted condition of the patient.

In using quinine for hypodermic injections, certain precautions should be taken: the solution should not be too strong; a part of the body should be chosen where the cellular tissue is abundant; the syringe and needle should be made aseptic by boiling in water; and the injection should be made slowly.

"Guaiacol dressings in gonorrhoeal orchitis."—*Journal des Praticiens*, March 30, 1895.

M. TAVITIAN in a thesis (1894) recommends guaiacol in cases of gonorrhoeal orchitis. It is free from danger, and can be conveniently applied by the patients. There is a true absorption of guaiacol which is eliminated by the kidney, as is shown fifteen minutes after the application, by the presence of guaiacol sulphate of potassium in the urine. The remedy is applied to the groin and the inner aspect of the thigh. It causes diminution of the pain and lowering of temperature.

Crystalline guaiacol after previous melting may be applied to the affected part, and to the groin, by a brush; two or three grams may be used each time.

A guaiacol ointment may be made thus:—

Guaiacol	5 grams.
Vaseline.....	50 "

This suits delicate skins better. It is rather early to pronounce definitely on the value of the treatment; but numerous cases have been under observation in the service of M. Balzer.

"Mental disturbance from iodoform."—*Lancet*, March 30, 1895.

In the *Neurologisches Centralblatt* there is an abstract of a curious case recorded by Dr. Oldenberg.

A female patient, aged 51, who had suffered from epileptic attacks from the age of 20, but in the intervals between the attacks had been quite healthy and not psychically peculiar, injured her hand in a fit and was treated with a 10 per cent iodoform ointment. Twelve days later she became excitable, restless and confused, and by and by had hallucinations. The urine gave a distinct iodine reaction. When admitted to hospital she talked incessantly, would not answer questions, could scarcely be kept in bed, and complained of plots and persecution. The restlessness increased, and the patient became cyanotic; the urine contained albumen, but gave a very slight iodine reaction. She then remained quiet for a few days, but became

again demented, after which she had another period of quietude followed by another outbreak, which, however, subsided, so that she was then able to be discharged. Dr. Oldenberg thinks the condition cannot be regarded as a post-epileptic mental disturbance, because of the interval that elapsed between the last attack and the onset of mental symptoms. He thinks it was determined by the iodoform poisoning acting upon a nervous system predisposed by epilepsy to grave disturbance.

"Treatment of ulceration by the local application of oxygen."—*Lancet*, March 30, 1895.

MR. G. STOKES showed, at a meeting of the Clinical Society of London, three cases to illustrate local treatment by oxygen gas. The first case was that of a woman, aged 56 years, who had for several years been suffering from an intractable ulcer of the leg, involving almost its entire circumference. She had been under treatment as an in- and an out-patient for years without any benefit. The limb was immersed in an atmosphere consisting of equal parts of air and oxygen gas. This treatment at once entirely relieved the pain from which she had been suffering; the gas caused a pricking sensation when first turned on, but this disappeared in the course of half an hour. The pus was found to be speedily freed from organisms, and the new skin formed was not cicatricial.

The second case was that of a man who suffered from extensive and intractable ulceration of the hand, following a poisoned wound of the finger. The rapidity of the healing under a similar atmosphere was remarkable; the nails grew so quickly that they had to be cut every day, and there was an exuberant growth of hair on the back of the hand. By the seventh day the wound was completely aseptic.

The third case was that of a girl who had lost nearly all her hair from alopecia areata. The head had been shaved previously, and no hair grew after that till the treatment was commenced. He fitted her with a rubber cap, and into this pure oxygen was pumped. At the end of six weeks she was getting quite a good head of hair.

Medical Jurisprudence.

HEDDERICH (VON L.). "Ueber Leberatrophie bei acuter Phosphorvergiftung."—*Münchener med. Wochenschr.*, Jan. and Feb., 1895.

ENLARGEMENT of the liver is usually regarded as one of the most characteristic *intra vitam* signs of acute phosphorus poisoning. The enlargement has been attributed on the one hand to fatty infiltration, and on the other to fatty degeneration—the latter view now prevails. The close resemblance in many aspects between acute phosphorus poisoning and acute yellow-atrophy of the liver has been the subject of much discussion; and, although there are certain differences in the

course of typical cases of the two diseases, the resemblance is so marked as to induce some observers to regard them as identical. The most important distinction between the two diseases is that, as a rule, the liver is greatly enlarged in phosphorus poisoning whereas it is atrophied to a corresponding degree in acute atrophy. Cases of undoubted phosphorus poisoning have been recorded from time to time in which the liver has been found atrophied; the case now dealt with adds another to the list.

A girl aged 18 put a box of matches into rather less than a gill of warm water for ten minutes and afterwards drank the water. Headache, fever, vomiting, diarrhoea, thirst, feebleness, and a jaundiced condition of the conjunctivæ followed. Three weeks after she entered Professor Erb's clinic, when her condition was as follows: Tongue fairly clean, no fever, pale complexion, yellow conjunctivæ, liver and spleen not enlarged, no abdominal tenderness; the urine was scanty, brown-red, turbid, and contained a trace of albumen, but never leucin, tyrosin, nor sarcolactic acid. Two days after the jaundice had spread to the skin, but there was no enlargement of the liver; on careful examination then, and subsequently, the liver was found to be diminished in size. The mental condition of the patient changed from one presenting no special features to a state of delirium. She then became somnolent and subsequently comatose. The pupils were dilated and sometimes acted and at others did not act to light. There were occasional twitchings of the muscles of the face. The knee-jerks were exaggerated, and ankle clonus could be evoked. She vomited from time to time, but no blood appeared in the vomit; there was no diarrhoea, the bowels being rather confined. There was no elevation of temperature of moment. Repeated examination of the liver showed considerable diminution in size; later on, regeneration set in and the organ re-acquired its normal dimensions. Some bleeding occurred on more than one occasion from the gums and nostrils, and petechial spots appeared on the abdomen. The patient eventually recovered.

For some time after the patient was admitted into hospital the history of phosphorus poisoning was not forthcoming, and consequently the diagnosis at the time tended to acute atrophy. The points given by v. Hedderich for differential diagnosis are: That in phosphorous poisoning the liver is usually enlarged; there are hæmorrhages; the cerebral symptoms are not prominent; no tyrosin nor leucin is found in the urine, but almost invariably sarcolactic acid. In acute atrophy: The liver is small; hæmorrhages are unfrequent; the cerebral symptoms are severe; tyrosin and leucin are found in the urine, but no sarcolactic acid. The author lays stress on the difficulty of distinguishing between acute atrophy and acute phosphorus poisoning in those cases in which the

liver is diminished in size, and he would not accept the diagnosis of acute atrophy in any case unless the possibility of phosphorus poisoning could be absolutely eliminated.

[The differential signs above given are misleading. In phosphorus poisoning the cerebral symptoms may be prominent; leucin and tyrosin are occasionally present in the urine. In acute atrophy hæmorrhages are also common, and sarcolactic acid has been found in the urine.]

GUTTENBERG and GÜRBER. "Untersuchungen über den Stoffwechsel bei acuter Quecksilbervergiftung."—*Münchener med. Wochenschr.*, Jan., 1895.

THESE investigations corroborate those previously made by Schröder and others, and show that the effect of poisonous doses of mercuric chloride is to lessen the metabolism of proteids to a very considerable degree. A solution of mercuric chloride was injected into the jugular vein of animals in doses equal to from one to two milligrammes per kilo. of bodily weight. Afterwards the urine was obtained every twenty-four hours, and the albumen which it invariably contained was removed before the estimation of nitrogen was made. Werthmann previously found that there was a considerable difference in the amount of proteid metabolism in summer and in winter respectively in rabbits under normal conditions. To meet this difficulty the experiments now recorded were conducted both in summer and in winter, the results showing that the interference with metabolism was greater in summer than in winter. The amount of nitrogen excreted in the urine during the first three days after the poison was injected was about one-third less per kilo. of body weight than in animals which received no poison. Doléris and Butte found that in poisoned animals the amount of urea in the blood was increased, therefore in order to obtain a true estimate of the proteid metabolism this excess must be added to the nitrogen of the urine, the two together giving the actual amount of nitrogen present. The investigations of Guttenberg and Gürber, which were conducted with due regard to the above-mentioned conditions, show that the effect of the mercuric chloride is to reduce proteid metabolism 47·38 per cent in summer and 20·39 per cent in winter.

MEIBOWITZ (P.). "On a case of acute poisoning by arsenic with subsequent multiple neuritis."—*The Journal of Nervous and Mental Disease*, New York, March, 1895.

A MAN, aged 19, accidentally swallowed a teaspoonful of powdered arsenious acid (about 70 grammes) distributed in a glass of water. He

immediately produced vomiting, which, however, was not copious. In three hours severe pains came on in the stomach, and he began to vomit spontaneously, and continued to do so at five to ten minutes' interval for three days. There was intense thirst; bloody urine, which was painful to pass; bowels at first relaxed then constipated; along with weak pulse and tendency to syncope. Two days after taking the poison the eyesight was affected, then deafness came on with hæmorrhage from the ears, followed by a discharge of pus. On the fourth day the patient became delirious, with ocular hallucinations. The tongue was blistered and swollen, the lips and face were œdematous. There was no skin eruption. At the end of the third week after taking the arsenic symptoms of neuritis developed: severe burning pains in legs and feet, and tingling without pain in hands; ataxic gait; ankle-drop; cold, cyanosed feet; tenderness on pressure of feet and legs; involuntary twitchings of muscles of calf, with atrophy. The knee-jerk was absent. The abdominal, epigastric, and gluteal reflexes were present. There was tactile anæsthesia along with bands of hyperæsthesia. Reaction of degeneration was present, and there was considerable atrophy of the muscles of the hands. The muscles of the trunk were not affected.

J. Dixon Mann.

Pathology and Bacteriology.

TUBERCULOUS INFECTION THROUGH THE ALIMENTARY CANAL.

By SHERIDAN DELÉPINE,
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WHEN a truth, whether scientific or other, goes against the interests of a large and powerful class of the community, it is generally ignored or resisted till a more powerful class enforces its recognition. For the last 30 years farmers and butchers have been roughly disturbed by mere scientists, medical observers, and veterinary surgeons, who have come to the conclusion that it is not safe for man or beast to feed on tuberculous products.

At first the observations of Villemin, Chauveau, Gerlach, Günther and Harms, Toussaint, Peuch, Bollinger, Jöhne, etc., though conclusive enough, were not accepted as quite convincing by a number of authorities, because there was no easy criterion by which tuberculous lesions could be recognised.

Even after Koch's demonstration of the presence of a tubercle bacillus, not only in human tuberculous lesions, but also in those of the lower animals, many who considered themselves experts tried to evade the logical consequences of this discovery.

At the present time opinions are still divided, and thereby the work of the Medical Officer of Health is rendered so difficult that he may at times be hindered from serving the public interests which he has to protect. I was much struck with this in connection with a case which occurred in Blackpool quite recently.*

Seventeen pieces of meat having been seized by the Inspector of Nuisances as unfit for food, Dr. Anderson, the Medical Officer of Health for the town, found that the meat not only showed general evidences of advanced disease, but that some of the lymphatic ganglia were enlarged, and presented areas of congestion and of suppuration or softening. In these glands Dr. Molloy demonstrated the presence of tubercle bacilli. There were other evidences of disease, but those just mentioned will suffice for the present purpose. On these grounds the meat was condemned. The butcher, however, chose to contest the validity of this judgment, urging that there had been an error, that the meat was fit for food, and that it was not set, simply on account of the weather.

The chief difficulty experienced by the prosecution was due to the possibility of it being said on behalf of the defence that the flesh of a tuberculous animal was not dangerous to eat. It was thought better to obtain confirmation of the magistrates' order, on the ground that the meat presented all the characters of unsound meat, than to bring in the question of tuberculosis. The meat was bad, and had all the characters of bad meat, and if meat inspection was to be of any use, this should be enough to justify the action of the meat inspector, the Medical Officer of Health, and the magistrate who originally condemned the meat. The fact that there was tuberculosis showed what was the actual nature of the danger that would be run by persons, and especially children, partaking of it, but the defence might have taken advantage of the difference existing between experts to obscure the main question. This putting aside of the question of tuberculosis led the experts for the defence to make statements which, in the light of the more complete knowledge in possession of the prosecution, showed the danger of disputing the necessity of condemning bad meat. Notwithstanding that the meat in question was pale, soft, not set, moist, that fat was almost entirely absent or replaced by a soft gelatinous, sodden tissue of bad colour, that the synovial membrane

* *The Blackpool Herald and Fylde Advertiser*, Tuesday, April 9, 1895.

attached to articular ends of bones was swollen and exuded a purulent looking fluid on pressure, that the lymphatic glands were enlarged, some deeply congested, others softened, apparently suppurating; it was asserted for the defence that such meat would not be harmful, would in fact be wholesome, could be condemned only on account of its being of low nutritive value, and that selling such meat as good meat would be taking money under false pretence.

Now had the experts called by the defence been acquainted with the fact that the animal, the carcase of which had been condemned, was suffering from advanced tuberculosis, and that lymphatic ganglia deeply situated among the muscles had been found much enlarged and altered by tubercular lesions, in which tubercle bacilli had been demonstrated, they could not have spoken of the state of meat as indicating a harmless condition, or if they had done so they would have had to prove that tuberculosis is not communicable by the consumption of tuberculous food. The latter view has been held by some eminent men, but it becomes more and more untenable.

The evidence which has been adduced to prove that the flesh of tuberculous animals was not capable of causing tuberculosis, though very interesting, cannot shake in the least the observations on which the opposite view is based. It is with the object of showing the bearings of the arguments brought forward by both sides that I will now attempt to give a short account of the present state of this question. The following remarks, with the exception of those relating to the recent publication of Nocard, were originally communicated three years ago in the shape of an address to the Medico-Ethical Society of Manchester.

It will be taken for granted that the infectiousness of tuberculosis has been fully demonstrated by the work of Villemin, of Koch, and of their followers. Tuberculosis of the lower animals is due to the same micro-organism as in man, and it can be communicated from man to the lower animals and from the lower animals to man. The well-known cases recorded by Tscherning and by Pfeiffer prove clearly that bovine tuberculosis is communicable by inoculation from cattle to man.

Numerous experiments, since the time of Villemin (1865), have abundantly shown that human tuberculous products of any kind were capable of producing tuberculosis in a large number of animals, when inoculated under the skin, into the blood vessels, into a serous cavity—in fact, into any part of the body. Professor Burdon Sanderson* has justly said that the identity of bovine and human tuberculosis is a thing to be

* BURDON SANDERSON. "Transactions of the International Congress of Hygiene and Demography." London, 1891. Vol. II., p. 185.

accepted as a fundamental proposition. This statement is not affected by the fact that there are certain differences in the morphology of the bacillus and in the character and mode of extension of the lesions in the two cases.

We need not either discuss the question of heredity as a causal factor in tuberculosis. It can be safely admitted that an exceedingly small number of children are affected at birth, and the same may equally truly be said of the young of the lower animals. The few cases of fatal tuberculosis recorded by Hiller, Shleuss and Grothaus, Jöhne, Landouzy and Martin, etc., though they show that it is possible for a foetus to be infected in utero, are of little importance when compared with the statistics given by Boltz,* for instance, in his "Inaugural Dissertation." Out of 2,576 children whose bodies were submitted to a post-mortem examination in Kiel, between 1873 and 1889, there were 424 cases of tuberculosis, or 16·4 per cent. The following table shows the percentage at different ages :—

Still-born children	0·0 per cent.
Up to 4 weeks old	0·0 "
5 to 10 months old.....	0·9 "
3 to 5 months.....	8·6 "
6 to 12 months	18·3 "
1 to 2 years.....	26·8 "
2 to 3 "	33·0 "
3 to 4 "	29·6 "
4 to 5 "	31·3 "
5 to 10 "	34·3 "
10 to 15 "	30·1 "

Woodhead† has given on a smaller scale results, equally significant, of 127 cases of tuberculosis :—

In children under 1 year	4 cases.
" " from 1 to 2½ years	38 "
" " " 3 " 5½ "	29 "
" " " 6 " 7½ "	12 "
" " " 8 " 10 "	13 "
" " " 11 " 15 "	9 "

Such statistics, and others not mentioned here, indicate clearly that tuberculosis usually begins after birth, and that it is a rare disease in the early months of life. There is ample evidence to prove that among the channels of infection the air passages are most important; a large number of children must, however, become infected through their alimentary canal, as seems to be proved by the following observations

* BOLTZ. *Journal of Comparative Pathology*, 1890, p. 370. *Thiermedizinische Rundschau*, Dec., 1890.

† "Laboratory Reports," Royal College of Physicians, Edinburgh, 1889. Vol. I., p. 181.

recorded by Woodhead:—Out of the above 127 cases of tuberculous children examined post mortem, 43 presented tubercular lesions of the intestine; 100 (i.e., 79 per cent.) tubercular lesions of the mesenteric glands; 14 tubercular lesions of the mesenteric glands only. Of the 43 cases with intestinal lesions, 24 were found in children between 1 and $5\frac{1}{2}$ years. Of the 100 cases with intestinal lesions 62 were found in children 1 to $5\frac{1}{2}$ years old. Of the 14 cases with mesenteric lesions, 9 were found in children 1 to $5\frac{1}{2}$ years old.

In a series of over 100 experiments made by myself, I have found that tuberculosis of the mesenteric glands occurs very late, if at all, in guinea-pigs infected through other channels than the alimentary canal or the peritoneal cavity, and when the mesenteric glands are affected in such cases all the other organs are in a state of advanced tuberculosis, but where the seat of inoculation is in the abdominal cavity, the mesenteric glands are, on the contrary, the first organs affected. In fact, it is generally possible, by carefully dissecting out the lymphatic ganglia, to find the part through which the animal has been infected.

To give only a practical instance of the results obtained, it will be enough to mention here that I have found a single prick of the tongue, of the lips, or of the fauces with a needle loaded with tubercle bacilli to be followed by marked tuberculosis of the cervical ganglia, the lesions in such a case resembling closely those observed in the neck of scrofulous children.

In presence of such observations, it is only right to assume that when the mesenteric glands are the only organs affected with tuberculosis, or when they are much more affected than other organs, the channel of infection must have been the alimentary canal.

Judging from the statistics recorded above, it is evident that this occurrence is far from unfrequent in children. In corroboration of this fact we have seen that children begin to be liable to tuberculosis after they have reached the age of six months (i.e., after most of them have begun to be fed on cow's milk, or foods other than the maternal milk).

There is, however, more than circumstantial evidence to show the danger of tuberculous food. Chauveau, Gerlach, Harmz and Günther, Jöhne, Nocard, Peuch, Viseur, etc., etc., have shown that tuberculous organs and flesh when given to various kinds of animals were capable of causing tuberculosis beginning in the abdomen. Gerlach, Klebs, Jöhne, Bollinger, Baumgarten, Peuch, Bang, etc., have proved the existence of the same danger in connection with the milk from tuberculous cows. By putting together the statistics given by Harmz and Günther, Gerlach, Jöhne and Peuch, we get a total of 87 experiments in which various animals were fed with flesh from tuberculous animals; out of these animals, 18 became tuberculous, i.e., about 20 per cent. In these

experiments the flesh had been obtained from tuberculous cows and oxen, and apparently taken without any special precaution. Nocard has pointed out that when cats are fed with muscle free from tuberculous glands, and not accidentally contaminated with tuberculous products coming from other organs, tuberculosis is never obtained. This is true even when young kittens are used, though these animals are easily rendered tuberculous by the ingestion of small quantities of tuberculous lungs, liver, and lymphatic ganglia.

In support of Nocard's contentions, we have the experiments of Peuch, Galtier, and Perroncito, showing that muscular tissue taken from tuberculous animals, but free from tubercular lesions, is practically incapable of producing tuberculosis by ingestion.

I will now only briefly allude to inoculation experiments, because it has been urged that subcutaneous or intraperitoneal inoculations are not a fair test of virulence, because it is much easier to transmit tuberculosis by inoculation than by ingestion.

It is interesting, however, to find that inoculation experiments give results resembling closely those which have been obtained in feeding experiments.

Thus, putting together the experiments made by Villemin, Gosselin, Toussaint, Galtier, Jeannel, we find that out of 56 experiments made to test the virulence of the blood of tuberculous animals, 28 yielded positive results; on the other hand, in 26 experiments performed by Bang, Nocard, and MacFadyean* we find that the blood was capable of causing tuberculosis in two cases only. It must be admitted that in many of the first series of experiments the blood had been collected without sufficient precaution to prevent the admixture of tuberculous products present in various parts of the body. For several other reasons many of these experiments may be objected to.†

Inoculations made with meat juice give equally ambiguous results. Out of 52 experiments by Gratia and Liénaux, Peuch, Galtier, Veyssiére and Humbert, Arloing, and Nocard, 14 yielded positive results. To these should be added the experiments of Bollinger and Steinheil,‡ and also those of Dreschfeld, which have given positive results. On the other hand, we have another series of 27 experiments by Bollinger and Kastner and by MacFadyean, with nothing but negative results.§ To these should be added experiments of Nocard and others, which have also yielded a very large proportion of negative results.

* MACFADYMAN. *Journal of Comparative Pathology*, 1892, p. 23.

† *Journal of Comparative Pathology*, 1890, p. 77.

‡ *Deutsche Zeitschrift für Tiermedizin*, Dec., 1889.

§ *Journal of Comparative Pathology*, 1892, p. 29.

The differences between results obtained by inoculation and ingestion are not, on the whole, so great as has been alleged by some writers.

From what precedes it is evident that there is no doubt as to the danger of eating tuberculous food, but there is a divergence of opinion among authorities as to the parts of an animal which are infectious.

Toussaint was of opinion that tuberculosis was a disease "*totius substantiæ corporis*" (from which it would follow that any part of the body was capable of producing tuberculosis by inoculation or ingestion). This view cannot be accepted as true, except in cases of very advanced general tuberculosis.

Various attempts have been made to prove that though this is not always true, the blood can, at times, contain enough tubercle bacilli to render any part of the body infectious. This, however, has been shown by Bang, Nocard, and Macfadyean to be an extremely rare occurrence.

The only thing which has been clearly proved is that whenever an organ shows distinct tuberculous lesions, this organ is capable of transmitting tuberculosis by inoculation or ingestion.

It is, therefore, interesting to find what is the prevalence of tuberculosis in the various organs of bovidæ, which of all the animals used for food, are those liable to tuberculosis. According to Nocard* the organs of oxen and cows are affected in the following order of frequency: Lungs and pleura, 40 per cent; lungs alone, 20 to 25 per cent; pleura and peritoneum alone, 15 to 20 per cent; lymphatic glands, genital organs, mammæ, bones, articulations, 15 to 25 per cent.

Nocard insists upon the fact that it is not very unusual to find lymphatic ganglia affected without there being any trace of tuberculosis in the viscera through which, he assumes, the tubercle bacilli have penetrated into the organism. This is not only true of the thoracic and abdominal ganglia, but also of those which are outside the cavities, notably the cervical and pharyngeal ganglia.

A slight knowledge of the distribution of lymphatic ganglia in the body will make it evident that there is hardly any joint of meat, as cut by the butcher, which does not contain one or more lymphatic glands. These ganglia have often been found to be diseased not only in the neighbourhood of the great serous cavities, but also in the extremities. This may even be the case without the meat showing any evidence of the existence of a wasting disease; in fact, tuberculous glands have been found in meat apparently of prime quality. Such an invasion of the peripheral lymphatics is, of course, generally most extensive in advanced cases in which wasting has taken place; the appearance of the meat in such instances easily betrays its unsoundness, as in the Blackpool case.

* NOCARD (Ed.). "*Les tuberculoses animales.*" Paris, 1895, p. 13.

If this invasion of the lymphatics is taken in consideration, the careful experiments by which several observers have tried to prove that the flesh of tuberculous animals is not infectious, by carefully separating the muscular from the surrounding tissues, are not of much practical value, notwithstanding their great scientific interest.

But it is not only through the presence of tuberculous glands in their midst that meat from tuberculous animals is rendered dangerous. Butchers, when they dress a carcase, do not, like the careful experimenter, sterilise their fingers and knives at each step of the dissection, they do not sterilise the walls, tables, hooks, etc., which they use after those have come in contact with tuberculous carcasses or offals. On the contrary, the meat constantly runs the risk of being contaminated with discharges or products coming from the tuberculous organs, which, no doubt, are condemned and destroyed, but leave traces behind them.

What is, therefore, the practical use in experiments on the infectiousness of flesh from tuberculous animals, to use muscles or blood, removed or collected under conditions which cannot be observed in the abattoir?

Nocard says that experiments in which precautions are not taken to avoid the contamination to which I have just alluded are not good experiments. This is perfectly true when one wishes to discover how infection is brought about; but, this being settled, it is still more important to know how the flesh of tuberculous animals, dressed in the usual way, will affect those who partake of it. Arloing has justly set aside Nocard's criticism, and maintained that it is impossible to pass over experiments proving the infectiousness of meat obtained without special antiseptic precautions.

It seems to me that whenever it has been proved that in the midst of a piece of meat there was a tuberculous gland, this piece of meat, and the whole carcase from which it has been taken, should be condemned. Not only when the meat looks unsound, but also when it seems in good condition.

Some might feel inclined to think that there is no reason for troubling much about the question, because, after all, tuberculosis of cattle is not frequent enough to cause serious danger. It has been found, however, that tuberculosis is far more frequent in the bovidæ than was suspected before tuberculin was used for diagnostic purposes.

Nocard says that, according to districts, 10, 15, 25, or more per cent of the cattle are affected with tuberculosis. He further states* that in stables where tuberculosis has existed for some years the proportion of tuberculous animals is always considerable, 50, 60 or even 80 per cent

* NOCARD. *Loc. cit.*, p. 103.

of the total number of animals may be affected. He gives several instances of the extraordinary prevalence of tuberculosis in certain forms. I will only quote one. In 1892 he tested by tuberculin 105 heads of cattle, and found that 55 of them were tuberculous, yet all these animals were on a large and well-kept estate in the North of France.

In Germany, Lydtin* has shown that out of 80 oxen and cows certified by competent veterinary surgeons to be healthy and fit for food, 17 were found after death to have tuberculous lesions (*i.e.*, 21 per cent). This shows the great necessity of careful meat inspection, or the use of tuberculin during life, for the 17 animals just referred to were found to give the reaction of tuberculosis with Koch's tuberculin. It is not necessary to quote a larger number of figures to prove a fact which is accepted by the majority of observers. Veterinary surgeons in England generally recognise that tuberculosis is a very common disease of cattle. It must be admitted that we are more often exposed to tuberculous infection through our food than we have been led to suppose till lately.

It is fortunate for us that it is only when the tubercle bacilli are pretty abundant that they are capable of causing disease in a healthy adult person. But in weak or young individuals the danger is much greater, and there is always the possibility that some bone or hard particle infected with tuberculous matter may wound the mucous membrane of the mouth, fauces, or some other part of the alimentary canal, and bring about tuberculosis just as in my experiments with the tuberculous needle.

It is not easy to prove the actuality of the danger by quoting cases in which tuberculosis has been undoubtedly the result of the ingestion of tuberculous meat.

The statistics quoted above to prove the frequency of abdominal tuberculosis in children appeal only to those who have made a large number of experiments and observations.

Even in those cases in which meat might be suspected to be the cause of tuberculosis it would be difficult to trace clearly the piece of meat which should be incriminated, and afterwards to establish clearly its history; and if this could be done, it is evident that the carcase from which the joint had been obtained would have long been beyond the reach of scientific investigation when tuberculosis had made sufficient progress in the victim to be evident.

With regard to infection by milk, however, it is sometimes possible to find a case showing clearly that infection has been due to the milk.

* LYDTIN. "Thieraraliche Mittheilungen." 1891.

Demme* mentions four cases occurring in children of healthy parents. Those children were clearly proved to have been fed on uncooked milk from tuberculous cows.

Demme says that out of 2,000 tuberculous children treated by him these are the only four in whom he could surely eliminate all other sources of tuberculosis. This, of course, does not show that these four cases were the only ones attributable to the consumption of milk, but that, in order to eliminate all possible sources of error, he was obliged to put aside a large number of cases possibly due to the ingestion of tuberculous food.

Ollivier and Boutet, quoted by Arloing,† record an outbreak of tuberculosis in a boarding-school. Cows were kept in that establishment. One of the cows supplying milk during a certain period was tuberculous, and during that time six of the children became tuberculous.

Stang‡ gives details of another case. A boy, aged five years, born of healthy parents, died from advanced tuberculosis of the mesenteric ganglia and miliary tuberculosis of the lungs. It was ascertained that he had been in the habit of drinking warm uncooked milk from a cow suffering from tuberculosis, as was proved by examination of the viscera after the animal had been slaughtered.

A still more telling instance is recorded by Dr. Gosse, of Geneva.§ His daughter was, at the age of 16, a strong and healthy girl, and there was no trace of tuberculosis in the family. About 10 months before her death she began to manifest signs of some mysterious illness, which caused gradual wasting, and ultimately the patient died at the age of 17. At the autopsy it was found that the poor girl had suffered from intestinal and mesenteric tuberculosis. It was then remembered that she used, when spending the Sundays on a small estate where cows were kept, to drink warm milk almost straight from the cows. These cows were, in consequence of this, examined; four out of the five were found tuberculous, and of these two had tuberculous udders.

Such instances of infection, though few, are sufficiently clear to establish the risks attending the use of tuberculous food.

It may be argued that meat is usually cooked before being eaten, and that the virulence of the tubercle bacillus is in this way destroyed; but it must be remembered that a large proportion of the meat used for food is either roasted or grilled, and that the internal parts of chops, beef-steaks, or roasted joints are seldom sufficiently cooked to kill bacilli.

* DEMME. Twentieth Yearly Report. Jenner's Children's Hospital, Berne, 1883.

† ARLOING. "Leçons sur la Tuberculose," 1892, p. 349.

‡ STANG. *Comptes rendus du Quatrième Congrès international Vétérinaire de Bruxelles*, 1883, p. 128.

§ *Journal de Genève*, October 31, 1898.

Chauveau and Arloing have shown that unless a tuberculous piece of meat has been kept all through at a temperature of 70° C. for about half an hour, it is still capable to infect animals. Now, whenever the inside of a joint is still red, it can be safely said that the temperature of the red parts has not even reached 70° C.

Toussaint has stated that three-quarters of the animals inoculated with the central parts of an imperfectly cooked tuberculous joint became tuberculous.

Jöhne, in 62 experiments, has found that tuberculous organs and flesh kept for ten to fifteen minutes in boiling water were still capable of infecting 35·5 per cent of the animals fed on them.

In parallel experiments made with the same tuberculous material uncooked, 65·5 per cent of the animals became tuberculous. If cooking is to be relied upon to destroy the virulence of tubercle bacilli, it is necessary that this cooking should be thorough, and that all the parts of the tuberculous joint should be exposed to a sufficient temperature.

Bang has shown that after milk had been kept at a temperature of 85° C. for five minutes, any tubercle bacilli which it might contain is killed. To obtain such a temperature in the centre of an ordinary joint, much more prolonged cooking than is generally desired should be allowed.

Such are the main facts and arguments which may be relied upon to prove the danger connected with the consumption of tuberculous meat. Many more observations and experiments might have been quoted, but it has been thought that they could hardly be more convincing than those alluded to in the text. Only few bibliographical references are given, because most of the information wanted will be easily found in works such as those of Aloing* and Nocard,* and also in papers by Woodhead and MacFadyean.*

Special notice has been taken of Nocard's views, because he is one of the strongest advocates of mild measures, and any admission coming from him has double value on that account.

It is hoped that the facts brought together in this short *exposé* will be enough to convince the reader of the seriousness of the matter at issue, and of the *real risk which is incurred if tuberculous meat is allowed to pass as fit for human food by meat inspectors.*

[The report of the Royal Commission on Tuberculosis not being available yet to the public, I regret not to be able to take advantage of it in support of my contention, but it may be said in a general way to establish the views here advanced.]

**Loc. cit.* and others.

Reviews.

"Handbook of the Diseases of the Eye and their Treatment." By H. R. SWANZY, M.B. Fifth Edition. London: H. K. Lewis, 1895.

THIS excellent handbook has now reached its fifth edition, and with advancing age has somewhat increased its bulk; it is to be hoped, however, that a limit will be set on this in future editions, else it will grow out of its present handy-book stage, now not too large, but just large enough for a student's manual, or a work of reference for the busy practitioner. We have been familiar with the book for many years, and have always regarded it as a deservedly popular and reliable précis of modern ophthalmology. Each new edition has had some new added facts and some fuller description of old ones. The present one quite keeps up the "up to date" character of its predecessors. Mr. Swanzy is always more or less dogmatic in his teaching, but it is dogmatism of the right kind, the outcome of mature experience and actual clinical experiment—that is to say, when he speaks strongly about any given treatment, we know that he has tried it himself, and, having given it a fair trial, his conclusions may be thoroughly relied upon. The fifth edition has been more or less remodeled, some chapters, as those on tubercle of the iris and optic nerve tumours, have been quite re-written. There is also a figure and an excellent description of Javal's astigmometer, a valuable instrument for rapidly estimating the degree and meridian of astigmatism. We do not remember having seen the apparatus mentioned in any other of the smaller ophthalmic text-books. The whole get-up of the book and clearness of the printing leaves little to be desired. The present edition has been revised and corrected under the superintendence of the author by Dr. Louis Werner.

"On Chorea and Choreiform Affections." By W. OSLER, M.D., F.R.C.P., Professor of Medicine, Johns Hopkins University, Baltimore. London: H. K. Lewis, 1894, pp. 125.

THIS interesting monograph is an excellent *resumé* of the present state of medical knowledge with respect to chorea and choreiform affections. It contains much original material and many valuable suggestions.

The chapter on the condition of the heart in chorea minor (which was published separately in the *MEDICAL CHRONICLE*, August, 1894) is, perhaps, the best in the book. The author states that "there is no known disease in which endocarditis is so constantly found,

post mortem, as chorea; it is exceptional to find the heart healthy"; and again "in the almost constant association with endocarditis fatal cases of chorea stand unique among diseases." Attention is drawn to the importance of chorea as a cause of chronic valvular disease, especially mitral disease, and hence the necessity of inquiring for a history of chorea in all cases of valvular disease of the heart. "In a considerable proportion of cases, much larger indeed than has hitherto been supposed, the complicating endocarditis lays the foundation of organic heart disease."

The pathology of chorea is still very obscure, but Professor Osler gives a good summary of the chief changes which have been found on microscopical examination of the nervous system. As regards the various views which have been broached respecting the pathology of the disease, he refers the reader to the larger works on diseases of the nervous system. He discusses chiefly the recent view that chorea minor is an infectious disorder, and presents the main points which have been urged in favour thereof. Osler concludes that "while on the one hand the course of the milder forms, and the not infrequent association with fright, favour the view that the disease is a simple neurosis; on the other, the course of the severer forms, the arthritis, and the almost constant presence of endocarditis in the fatal cases, speak for an acute infection." As regards treatment the author attaches great importance to rest and seclusion. "The child should be put to bed and kept there until the movements have ceased."

A chapter is devoted to the choreiform affections, which are divided into four groups: (1) Simple tic, habit spasm, generalised tic, (2) tic with coprolalia, echolalia, etc.; (3) complex coördinated forms of tic; (4) cases of noisy spasm of respiratory muscles.

A good account is given of Huntington's chorea, for which the author prefers the name of chronic progressive chorea. Huntington's original graphic account is quoted. The three marked peculiarities of the disease, according to Huntington, are: "(1) Its hereditary nature; (2) a tendency to insanity and suicide; (3) its manifesting itself as a grave disease only in adult life." Osler also draws attention to the slowness of the choreic movements, especially those of the face, which he has "never seen presenting that rapidity so characteristic of chorea minor," though this difference has not always been appreciated by other writers. The gait Osler regards as one of the most striking peculiarities of the disease. "The station may be good with the exception of a slight swaying of the trunk, but on attempting to walk, the unsteadiness develops, and is characterised by large lateral deviations from the straight line, by marked swaying of the body, and sometimes by precipitate movements, in which the patient

almost falls, but catches himself." "It has been very well compared with the gait of a drunken man." With respect to diagnosis, the author regards the absence of *spasm* as a point of great importance.

The book, like all Professor Osler's works, is well written, and we can strongly recommend it as a most valuable contribution to the subject of which it treats.

"Biological Lectures and Addresses." Delivered by the late Professor A. MILNES MARSHALL, M.A., M.D., D.Sc., F.R.S. Edited by C. F. MARSHALL, M.D., B.Sc., F.R.C.S. London: David Nutt, 1894.

"Lectures on the Darwinian Theory." Delivered by the late Professor A. MILNES MARSHALL, M.A., M.D., D.Sc., F.R.S. Edited by C. F. MARSHALL, M.D., B.Sc., F.R.C.S. London: David Nutt, 1894.

SOME of the lectures and addresses included in these volumes have previously appeared in the transactions of the several societies before which they were originally delivered, but Dr. C. F. Marshall has done well to collect them together and, with the addition of others hitherto unpublished, to issue them in their present form. Both volumes will be warmly appreciated by the many admirers of the late Professor A. Milnes Marshall, and especially by his former colleagues and pupils.

The incisive directness, lucidity, and thoroughness which characterised all Professor Marshall's writings and lectures are conspicuous throughout the series before us.

Probably some parts would have been modified had the author himself prepared these lectures for publication in book form, but the work of revision and editing has been admirably done by his brother, Dr. C. F. Marshall, whose personal knowledge of the views and aims as well as of the actual work of the late Professor Marshall, enabled him to amplify and elaborate where he deemed it necessary. We can well understand how keenly the responsibility of doing so would be felt by him.

Detailed criticism of the lectures and addresses is not necessary, it will be sufficient if their scope and extent are simply indicated by a reference to the contents of each volume.

(a) Biological Lectures and Addresses: (1) The modern study of zoology; (2) the influence of environment on the structure and habits of animals; (3) embryology as an aid to anatomy; (4) the theory of change of function; (5) butterflies; (6) fresh-water animals; (7) inheritance; (8) the shapes and sizes of animals; (9) some recent developments of the cell theory; (10) animal pedigrees; (11) some recent embryological investigations; (12) death; (13) the recapitulation theory.

(b) *Lectures on the Darwinian Theory: (1) History of the theory of evolution; (2) artificial and natural selection; (3) the argument from palæontology; (4) the argument from embryology; (5) the colours of animals and of plants; (6) objections to the Darwinian theory; (7) the origin of vertebrated animals; (8) the life and work of Darwin.

"Aids to Surgical Anatomy." By E. S. YONGE, M.B. London: Baillière, Tindall, and Co., 1895.

THIS is an attempt "to condense and systematise the principal facts of surgical anatomy" into a small volume of 155 pages. It is not intended as a substitute for standard works on the subject, and it can hardly be accepted as an effective aid, for condensations of this kind seldom serve any really useful purpose, and multiplication of such books is, on the whole, to be deprecated. So far as the present volume is concerned, it is well arranged, and singularly free from the errors which so readily slip into anatomical works. The author has evidently exercised both care and discretion in its compilation.

Of the few illustrations which appear, there is nothing to be said, though attention may be directed to the somewhat remarkable diagram on page 12, showing "the relative positions of cortical areas."

PUBLICATIONS RECEIVED.

"Discovery of the Circulation of the Blood." By Dr. HARVEY. Privately reproduced in facsimile from the original edition printed at Franckfort-on-the-Maine in the year 1628, with a Translation and Memoir, for G. Moreton, 42, Burgate Street, Canterbury. (1894.)

From Cassell & Co., London:—

"Medical Handbook of Life Assurance." By JAMES E. POLLOCK, M.D., F.R.C.P., and JAMES CHISHOLM.

From Churchill & Co., London:—

"Mentally Feeble Children." (1s. 6d.) By FLETCHER BRACH, M.B., F.R.C.P.

From Griffin & Co., London:—

"Infancy and Infant Rearing." By J. B. HELLIER, M.D.

From H. K. Lewis, London:—

"The Extra Pharmacopœia." 8th Edition. (9s.) By W. MARTINDALE, F.C.S., and W. WYNN WESTCOTT, M.B.

* This volume is provided with 37 excellent illustrations, mostly from original drawings and photographs.

"A Manual of Gynæcological Practice." (6s.) By Dr. DÜHRSEN.
Translated by JOHN TAYLOR, F.R.C.S., and FREDERICK EDGE,
M.D., M.R.C.P.

"Surgical Diseases of Children." (10s. 6d.) By D'ARCY POWER,
M.A., M.B., F.R.C.S.

From Geo. Palmer, Leicester :—

"Forty-fifth Annual Report upon the Health of Leicester." By
JOSEPH PRIESTLEY, B.A., M.D.

From G. Steinheil, Paris :—

"Chirurgie du Rectum." By E. QUÉNU and H. HARTMANN.

From the Scientific Press, Ltd., London :—

"A New Method of Inhalation." (1s. 6d.) By W. H. SPENCER,
M.A., M.D., M.R.C.P.

Local News.

POST-GRADUATE CLASSES.

THE regular courses of lectures and demonstrations in connection with the Owens College, commencing on June 10, are as follows :—

CLINICAL MEDICINE : Four lectures on Abdominal Tumours and Diseases of the Stomach and Intestines, illustrated by clinical cases. By Professor Dreschfeld, at the Royal Infirmary.

CLINICAL SURGERY : Four demonstrations on selected surgical cases. By Professor Jones, at the Royal Infirmary.

CLINICAL GYNÆCOLOGY : Diagnosis and treatment demonstrated in groups of selected cases. By Professor Sinclair, at the Southern Hospital, Clifford Street, Oxford Road.

DISEASES OF THE EYE : Five demonstrations on the Diseases of the Eye most commonly met with in practice. By Dr. Glascott, at the Royal Eye Hospital, Oxford Road.

DISEASES OF THE EAR : Five practical demonstrations on the diagnosis and treatment of the principal Diseases of the Ear, illustrated by selected cases. By Dr. Milligan, at the Manchester Institution for Diseases of the Ear, 23, Byrom Street, Deansgate.

LARYNGOSCOPY AND DISEASES OF THE RESPIRATORY ORGANS : (1) Demonstrations on the use of the laryngoscope and exhibition of patients, illustrating various diseases of the larynx, etc. (2) Demonstrations of selected cases of intrathoracic disease. By Dr. T. Harris, at the Royal Infirmary.

DISEASES OF THE SKIN. By Dr. Brooke, at the Hospital for Diseases of the Skin, Dale Street.

OPERATIVE SURGERY : Each member of the class will have an opportunity afforded him of performing operations on the dead body. By Mr. F. A. Southam, at the Owens College.

Syllabus and time table with further particulars of the above classes will be forwarded on application to the Registrar.

Dr. A. HILL GRIFFITH announces a series of eight practical lessons on the "Use of the Ophthalmoscope and Estimation of Refraction," to be given at the Royal Eye Hospital, St. John Street, commencing on the 1st of May.

Dr. C. F. SHERRINGTON, F.R.S., Lecturer on Physiology at St. Thomas's Hospital, has been appointed the Holt Professor of Physiology in University College, Liverpool.

A. W. CROSSLEY, M.Sc. (Vict.), Ph.D., Bishop Berkeley Fellow of the Owens College, has been appointed Demonstrator in Chemistry to the St. Thomas's Hospital, London.

A. W. W. LEA, M.D., B.S. (Lond.), F.R.C.S., has been appointed Assistant Lecturer on Obstetrics and Gynæcology to the Owens College, Manchester.

T. N. KELYNACK, M.D. (Vict.), B.Ch., has been admitted a member of the Royal College of Physicians of London.

THE MEDICAL CHRONICLE:

A MONTHLY RECORD OF THE

Progress of Medical Science.



ON THE TOXIC ACTION OF ARSENETTED HYDROGEN, ILLUSTRATED BY FIVE CASES.

By J. DIXON MANN, M.D., F.R.C.P.,

Professor of Forensic Medicine and Toxicology in the Owens College; Physician to the Salford Royal Hospital;

AND

J. GRAY OLEGG, M.D., B.S.Lond., M.B., B.Ch.Vict., F.R.C.S.,

University Scholar and Gold Medallist in Forensic Medicine, London.

THE investigations recorded in this communication were made on five cases of poisoning by arsenetted hydrogen which occurred in a manufactory where, for trade purposes, it was necessary to dissolve a considerable quantity of zinc in hydrochloric acid. This was done in an out-house by placing the materials in a large vat, without any means being provided for conducting away the fumes evolved. It would be futile to demand that arsenic-free materials should be used in industrial operations on a large scale: the cost is prohibitive. It would be equivalent to demanding the cessation of processes which are indispensable in many trades. It ought, however, to be a standing rule at all works where zinc is dissolved on a large scale in sulphuric or hydrochloric acids, or where any similar operations are performed in which hydrogen is largely evolved from crude materials, that the process should be carried out in a closed vat, furnished with a sufficiently wide earthenware tube, so as to conduct the gases evolved directly into the tall chimney of the works. In this way dangerous fumes are carried away by the powerful upcast of the shaft even when it is necessary to open the trap door in the cover of the vat; the workmen are thus

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enabled to fulfil their duties without incurring any risk. For specimens of the hydrochloric acid and zinc used in the operations which gave rise to these cases we are indebted to Dr. Thomas Harris. The acid had the usual yellow colour of the common commercial acid; its specific gravity was 1.141, and it contained 0.309 per cent of metallic arsenic. The zinc also contained arsenic in small amount. The accident was due to the enormous amount of arsenic present in the acid, which converted the hydrogen given off during the dissolving process into arsenetted hydrogen.

For the opportunity of investigating the following cases we are indebted to Drs. Andrew, Mackenzie, Nelson and Sidebottom of Glossop.

Case 1.—F., aged about 52, had been occasionally engaged in this work for some months. He began working for the last time on Tuesday, March 27, 1894, and continued until the evening of Thursday, March 29, when he left at his usual hour, 5.30 p.m., complaining of a pain in his back. He was seen on the morning of the 30th. Vomiting began on the 29th and continued on the 30th and 31st at frequent intervals. For the first 36 hours the vomit contained clotted blood. The bowels were constipated, but were opened twice by purgatives during the illness; on each occasion the fæces were streaked with blood. He had griping pains on the evening of the 29th, and complained of pains in his left side. He passed dark red urine; after noon on the 31st he ceased to pass any urine. Erythematous patches were observed on the legs on the 30th. There was injection and yellowness of the conjunctiva, and the skin was of a dusky hue. Fætor of breath was noticed. He began to ramble on April 2nd, and was quite delirious towards the end. He died on April 4th in the early evening, after an illness of six days.

Post-mortem, about 22 hours after death:—The body was that of a well-nourished elderly man. Rigor was well marked. There were two oval patches of discoloration on each side of the abdomen, with marks on the skin produced by scratching. General hypostasis was but slightly marked, except on the ears and posterior halves of the cheeks, which were livid. The pupils were equal, and moderately dilated. The lips were somewhat livid. There was a dark blue line on the margin of the gums. The brain was anæmic, but otherwise normal.

Thorax: The pericardium contained about three ounces of fluid (coloured as if bile stained). Heart: The right auricle was distended with clot, half of which was decolorised, and was continued as a long decolorised clot extending into the superior vena cava. The tricuspid valves and orifice were normal. The right ventricle contained a clot, a small part of which was decolorised. The left auricle was filled with ante- and post-mortem clot, which extended into the four pulmonary veins. The mitral orifice admitted the tips of two fingers, and the valves presented some irregular thickening near their free margin. The pulmonary and aortic valves and aorta were normal. Ante-mortem clots were present in the pulmonary artery and aorta. The pleuræ contained a small quantity of fluid similar to that in the pericardium. The visceral and parietal pleuræ showed a deeper violet coloration than usual. The left lung was emphysematous at the apex and anterior border. The lower lobe was much congested and cedematous. The right lung showed similar changes, but was more emphysematous at the apex. The bronchial mucous membrane was slightly reddened.

Abdomen : A blue discoloration was observed over the whole of the intestines, and a very deep blue over the anterior portion of the lower surface of the liver, especially to the right side. The omentum was of a bluish colour. A small quantity of yellow serum was found in the pelvis. The œsophagus was normal. The stomach contained a small quantity of yellow bile-stained mucus with some milk curds; the mucous membrane was deeply congested and stained bluish; the surface appeared gelatinous, and presented a large number of petechiæ. The mucous membrane of the small intestine was gelatinous at the upper end. Along its whole length there was more or less congestion, which was extreme in the first ten feet below the duodenum. A foot above the ileo-cæcal valve the congestion was very marked, and ecchymoses were present for three feet above the valve; for the next four feet the congestion was less marked, but at seven feet above it was again congested. The large intestine was stained a deep bluish green. On the edges of the folds of the mucous membrane there was distinct hyperæmia. The liver was large; on section it was firm, the general colour being normal. The patch of surface discoloration near the anterior margin in the usual position of post-mortem change, extended to a depth of one-eighth of an inch. The gall bladder was full. The spleen was of normal size, firm, and deeply congested. Its capsule was not easily stripped. The serous coating was blue. The right kidney was firm, and very much swollen. A small patch of bluish discoloration was seen on the lower part of its anterior surface. The capsule was not adherent. On section, the substance was dark red. The pyramids showed blue-black patches in their central parts. The left kidney was much swollen and resembled the right. The bladder was contracted, and only contained half a drachm of fluid which was tinged with a mere trace of blood-colouring matter, and which on microscopic examination showed the presence of kidney epithelium, fatty casts, and large corpuscles. Albumin and a trace of bile pigment were present.

Case 2.—R., aged 50, worked at the vats, as a rule. He worked on March 26, and was again at work on Thursday, March 29, from morning until 5-30 p.m., when he went home, feeling unwell. He vomited before leaving the works. He was first seen on Friday morning, March 30, and then complained of pain over the liver, in the epigastrium, and deep-seated pain in the back. He had vomited bile and blood, and had had several evacuations of the bowels. The stools at first consisted of feces and blood clots, but on March 30 they contained "bile and blood." There was tenesmus during the whole illness. He was jaundiced, and the skin was of an ashy dusky colour. The conjunctivæ were yellow. There was tenderness over the liver, and the pain in the back lasted till the evening of the 31st. He was very restless the whole time of his illness, and the friends and patient affirmed that he never passed any urine. On April 1, a catheter was passed, and about one drachm of blood-stained urine was drawn off. The pulse was very feeble, the heart sounds were normal though soft. He complained of dryness of throat and thirst. There was dyspnoea for the last two days. Bubbling râles, audible without the stethoscope, were heard all over the chest. There was no dulness over the lungs either anteriorly or posteriorly. No foster of breath was noticed. There was no cyanosis, and no nervous symptoms were observed, with the exception of delirium towards the last. Death took place on April 5.

Post-mortem, 33 hours after death. The body was that of a well nourished elderly man. Rigor mortis was well marked. The hypostasis was of ordinary degree, except on the ears and the posterior half of cheeks, which were very deep blue. The pupils were equal and somewhat contracted. A broadish blue line existed on the gums, especially on those of the lower jaw. There were no external markings. The brain was normal.

Thorax : The pericardium was lined with fat and contained an ounce and a-half of fluid. The heart was somewhat enlarged. The right auricle contained a small amount of decolorized clot, with some fluid blood, but was not distended. The tricuspid valve and orifice were normal. The right ventricle was somewhat dilated, its walls were thin and flabby, and it contained some ante-mortem clot. The left auricle contained post-mortem clot. The mitral orifice admitted three finger tips. There were irregular thickenings on the mitral valves, apparently not inflammatory. The left ventricle was hypertrophied, and its walls were firm. The pulmonary and aortic valves were normal. Both pleuræ contained a small quantity of fluid. There were extensive adhesions on the right side, and on the left side the sub-pleural tissue was very oedematous, giving the appearance of a colourless jelly on the surface of the lung. The right lung was heavier than normal, very oedematous, and the lower lobe was deeply congested. The left lung was more markedly oedematous and congested than the right.

Abdomen : The stomach was deeply congested with petechiæ over the whole mucous surface. The small intestines showed the mucous coat gelatinous and congested, especially at the margins of the valvulæ conniventes, where there were small hæmorrhages mostly about half-way down. About one foot below the pylorus a large amount of yellowish mucus was found in the lumen. The Peyer's patches were easily seen. The cæcal mucous membrane was normal. At the lower part of the sigmoid flexure the gut was deeply congested. The liver was somewhat enlarged. Its surface was smooth ; on section it was firm, and in colour normal. The spleen was very deeply congested ; its substance was very friable ; the capsule was stripped off with great difficulty. The right kidney was much swollen and rounded. The capsule was not adherent. On section, deep congestion of the whole organ was evident, and the pyramids were of a bluish black colour. The left kidney was like the right, except that the pyramids were not so deeply coloured. The bladder was contracted and empty, and its mucous membrane was normal.

Microscopical examination.—**Liver :** The cells are swollen and cloudy, but the nuclei stain with logwood. There is no appreciable bile staining. In a section stained with osmic acid irregular areas of fatty degeneration are seen containing particles of fat stained black. No deposit of iron was discovered in the liver by treating with potassium ferrocyanide and hydrochloric acid. Sections of spleen show extensive congestion and slight fatty degeneration of some of the cells. In the kidney the glomeruli are swollen and fill their capsules ; in some places there is detachment of the epithelium lining Bowman's capsules ; in other glomeruli there is slight proliferation of the same epithelial cells. In some tubules the epithelial cells have partially and in some wholly disappeared. Some of the tubules are choked with shed cells and granular debris, and in others the epithelial cells have proliferated. Much of the granular debris consists of blood-colouring matter. The epithelial cells themselves are in many cases swollen and cloudy, and are in various stages of detachment and disorganisation, showing granules staining black with osmic acid. The blood vessels are very congested, and there is some slight cirrhosis of old standing. The spleen shows extremely marked congestion, and some of the cells show slight fatty degeneration.

Case 3.—Male, æt. 30, began to work at this special branch on April 3. His illness began the same evening with malaise and the passing of dark-coloured urine, accompanied by pain in the back. He was seen on April 4, when he still complained of pain in the back, and was passing porter-like urine. He was sitting up in bed. The bowels being constipated, pil colocynth co. was given with purgative effect, but there was no mælena. There was no fœtor of the breath, and it is doubtful if there

was any vomiting. The patient was weak, anæmic, and jaundiced. The number of corpuscles in the blood was counted on April 7, and found to be 1,800,000 per cubic millimetre, and the amount of colouring matter varied in different corpuscles. The urine contained albumin on April 4. Urine passed on April 5, sp.g. 1022; reaction, alkaline; colour, black, like porter; when diluted with four volumes of water it was red, like blood and water. The spectrum was that of oxyhæmoglobin. Bile pigment was present, but no bile acids. The urine contained 0·06 per cent of albumin and 1·4 per cent of urea. Microscopical examination showed the presence of epithelium, chiefly from the kidneys, epithelial casts, large exudation cells, a few red blood discs, and much fatty granular matter. There was no inorganic deposit. No albumin was detected on April 7 and 8. The specific gravity varied during the illness between 1010 and 1020. A specimen voided on April 9 was bright red in colour, and gave the spectrum of methæmoglobin. The microscopic appearances were as in the specimen of April 3, but the deposit on standing was much less. A small amount of bile pigment was present. On April 11, the urine was quite clear. The patient eventually recovered his usual health.

Case 4.—Male, æt. 19, was put to this branch of work on April 3. His illness began the same afternoon after filling the vats. The first symptoms were general malaise and the passage of dark-coloured urine, accompanied by pain in the back. He was seen on the morning of April 4. He had slight pain at the epigastrium, and was constipated. Castor oil was administered on the night of April 3, a normal motion resulting. There was no vomiting, no foster of breath, and the tongue was clean. There were no tender points. He was weak, anæmic, and jaundiced. The patient had a cough for a week after the commencement of his illness. On April 7 the number of red blood corpuscles was 2,700,000 per cubic millimetre. The urine passed on the third day after the symptoms showed themselves was reddish-brown in colour, acid in reaction, with a sp. g. of 1025. The spectrum of acid hæmatin was obtained with difficulty; on adding ammonium sulphide the spectrum of reduced hæmatin was very distinct. A small amount of bile pigment was present; bile acids could not be found. Albumin, 0·11 per cent, and urea 2·7 per cent, were present. There was a copious deposit, consisting of amorphous urates, debris of red blood corpuscles, epithelium, chiefly renal, undergoing fatty changes; large corpuscles, some of which were agglomerated together, along with large and small casts, fatty and hyaline, in great numbers.

A second specimen passed three days later was light-red in colour. On standing, the colouring matter entirely subsided, leaving the urine of a clear yellow colour. The colouring matter yielded a very faint spectrum of methæmoglobin. No bile pigment nor bile acids could be detected. The urine was acid in reaction, sp.g. 1018, and contained 0·08 per cent of albumin, and 3·1 per cent of urea. The microscopic appearances were as before, the deposit being less copious. Albumin was not found in urine passed on April 10 and 11. Recovery eventually took place.

Case 5.—Male, æt. 42, began to be ill on the night of March 29. Patient had worked occasionally at this same job without any symptoms. About noon on March 29 he went for about five minutes to help to lift a mug about the size of a beer barrel just charged with zinc and acid with no cover on; he then resumed his own work of firing without experiencing any immediate effects. He returned about 7 p.m. to close a window over the tanks; this took two to three minutes, and he then went back to his regular duties till 8 p.m. At 10 p.m. he began to feel queer, and vomiting came on. He experienced pains in the epigastrium, which were very violent—lasting all that night. About 12 p.m. he passed very dark urine. He had

some pain in the back on the 30th. There was no vomiting after the first night, but occasionally nausea. Jaundice was noticed on the 20th, and it had not quite disappeared on April 11. There was no diarrhoea, purgation being produced by magnesium sulphate three days after the illness began. The patient was in bed a week. The urine on April 11 was quite clear. He was slightly anæmic on the 11th, and though he was walking about he did not feel quite well. He eventually recovered.

Chemical examination of the viscera yielded the following results :—

In Case 1 arsenic was found to be present in the liver, kidneys, bile, urine, blood, and in the fluid from the pericardium and the pleuræ. In the liver only was the amount sufficient to enable a quantitative estimation to be made ; it equalled $\cdot 002$ gramme As_2O_3 for the entire viscus.

In Case 2 arsenic was found in the liver, kidneys, and in the spleen. In 37cc. of blood and serum not a trace of arsenic could be found. From the liver the amount of arsenic obtained equalled $\cdot 0016$ gramme As_2O_3 .

An unsuccessful attempt was made to ascertain the presence of AsH_3 in the tissues by distilling the blood in vacuo ; no trace of the gas could be found in either case.

The published cases of poisoning by AsH_3 , comparatively few in number, have been tabulated by various writers from time to time. The latest and very complete tabulation, comprising 37 cases, is by Geigy.* To these, 12 other cases, including the 5 dealt with in the present paper, have to be added, completing a list of 49 cases, which, it is believed, includes all cases published up to the present time. Many of these cases occurred in groups ; in three instances 2 persons, in two instances 4 persons, in two other instances 5 persons, and in one instance 9 persons were simultaneously poisoned by the inhalation of AsH_3 from a common source. The remaining cases were of isolated occurrence. All were of accidental causation. Thirty-one cases, of which 11 died, were due to the inhalation of AsH_3 in trade pursuits ; 10 cases, of which 6 died, resulted from the incautious performance of chemical experiments ; 8 cases, of which 1 died, were caused by the inhalation of hydrogen for the purpose of repeating Tyndall's well-known experiment of thus altering the *timbre* of the voice, the gas having been prepared from substances which were afterwards found to have been contaminated with arsenic. Of the 31 trade cases, in one only was AsH_3 intentionally developed ; in all the rest its presence was due to unsuspected contamination either of the zinc, or of the sulphuric or the hydrochloric acids employed. Of the 10 cases due to chemical experimentation, in 4 at least AsH_3 was intentionally produced ; strangely enough in one of these four the arsenic was derived from the viscera of a girl who died from arsenical poisoning, the amount given off by the

* "Beitrag zur Kenntniss der Arsenwasserstoff-Vergiftung des Menschen," 1890.

Marsh's apparatus used being sufficient to produce symptoms of AsH_3 , poisoning in the chemist who performed the analysis. Obviously in none of the cases of acoustical experimentation was there any intention to develop AsH_3 . The onset of the symptoms in some cases was immediate, in others not until from 8 to 10 hours after the gas was inhaled. The earliest period at which death took place was on the second day, the latest was on the thirtieth day. In fatal cases the average period of survival is about nine days. In one-half of the fatal cases death occurred between the fifth and the seventh day after the inhalation of the gas. With the exception of 2 cases, in which death was delayed until the twenty-fourth and the thirtieth days respectively, the limit of survival did not exceed ten days. In 36 out of the total number of cases hæmoglobinuria or hæmaturia was present; in many of the other cases no mention is made of the appearance of the urine, in some of these, therefore, the urine may have contained blood colouring-matter. Pain in the loins was complained of in 15 cases. In 8 cases there was anuria, of these 5 died. In 37 cases the skin was jaundiced. In 34 there was either retching or actual vomiting; in some instances the vomit contained blood. In about 50 per cent of cases headache and dizziness were prominent symptoms, and in 38 per cent shivering or pronounced rigors occurred. In all cases in which the red blood corpuscles were counted they were found to be greatly below the normal number; in one case they were diminished to 920,000 per cubic millimetre.

When arsenic is administered in repeated small doses it tends to attack the blood. This is shown in the advanced stage of chronic arsenical poisoning by the occurrence of anæmia and of skin pigmentation. The pigmentation, or bronzing, of the skin, is due to deposition in the lymphatics of the skin, especially about the papillæ, of granules of altered blood colouring-matter. A certain proportion of the hæmoglobin is converted by the arsenic into a substance, of which the granules consist, closely resembling bilirubin. When arsenic is combined with hydrogen, as arsenetted hydrogen, its action on the blood is greatly intensified, so much so that AsH_3 may be regarded as a typical blood-poison of that group, the members of which act chiefly by dissolving the red blood corpuscles without causing any very marked changes in the liberated hæmoglobin.

When the gas is inhaled by human beings, it rapidly disintegrates the red blood corpuscles, liberating the hæmoglobin and giving rise to oligæmia, hæmoglobinuria, or hæmatinuria, icteric hue of the skin, and to certain embolic changes in the smaller blood vessels. The cases 3 and 4 illustrate the enormous destruction of red corpuscles, the

numerical reduction being at the rate of 64 and 46 per cent. Not only is the number of red corpuscles diminished, but the percentage of Hb present in those which persist is materially reduced. This points to partial damage sustained by the corpuscles, due to the action of the gas, which allows some of the Hb to leak away without actual solution of the stroma. The rapidity with which the gas acts on the blood is shown, in many cases, by the almost immediate occurrence of rigors, prostration, dizziness, pains in the head and epigastrium, vomiting, and, shortly after, by the appearance of blood colouring-matter in the urine. The cases narrated show that the blood colouring-matter may occur in the urine, either as hæmoglobin, methæmoglobin, or as hæmatin. In one of the cases, the urine, which was first voided, contained oxyhæmoglobin; that which was voided a few days subsequently contained methæmoglobin. The reaction of the urine, which contained hæmatin, was strongly acid; whether this was the reason of splitting up of the hæmoglobin, or whether the colouring matter existed as hæmatin when it reached the urine, is uncertain. In another case, the urine first obtained after the occurrence of the symptoms contained a large amount of O_2Hb ; this urine was alkaline in reaction.

With the view of ascertaining the effect produced by AsH_3 on hæmoglobin, the gas was passed for varying periods through fresh human blood. The result obtained showed that AsH_3 has a tendency, which however is not very strong, to convert hæmoglobin into methæmoglobin. After AsH_3 has passed through blood for about four or five minutes—the exact time required varies with the temperature—the colour of the blood changes from red to dirty brown, and if examined with the spectroscope the narrow band of methæmoglobin between C and D is distinctly seen, the two bands of O_2Hb still persisting, however, without any perceptible loss of definition. When blood thus altered is exposed for some hours to the air, at a temperature of about $60^\circ F.$, the methæmoglobin band disappears and the spectrum returns to that of O_2Hb . This shows an action which resembles that of the feebler acids, such as boric acid, upon blood. If AsH_3 is passed for half-an-hour through blood a considerable proportion of the hæmoglobin is converted into methæmoglobin, which is stable and does not revert to O_2Hb on exposure to air. The inference to be drawn is that in the living organism the chief rôle of AsH_3 is that of a disintegrator of the red corpuscles of blood, with some tendency to convert the hæmoglobin into methæmoglobin. Schmidt* believes that free hæmoglobin, when not attacked by the poison which liberates it from its corpuscles, is partly changed by the liver cells into methæmoglobin in the process of an ultimate conversion into bile-

* *Biolog. Centralblatt*, 1890.

pigment. Kobert* holds that there is a stage intermediate between methæmoglobin and bile-pigment, in which the colouring matter, whilst closely resembling hæmatin, yields no spectrum; on the addition of reducing agents, however, it can, at least partially, be converted into hæmochromogen.

Within the vascular system the alterations in the blood give rise to well-marked changes in the tissues. The "shadows" and débris of red corpuscles, which have partially or wholly lost their hæmoglobin, along with discrete and agglomerated granules of colouring matter and hæmoglobin crystals, materially aided by the presence of fibrin ferment liberated from the damaged corpuscles, collectively tend to the formation of thrombi in the smaller blood vessels, with the usual results to the organs supplied by them.

Another symptom to be considered, which is also due to the abnormal condition of the blood, is the icteric hue of the conjunctivæ and of the skin. The rapid and frequent occurrence of this symptom, after the appearance of free hæmoglobin in the blood plasma, is a seductive fact on which to build up an hypothesis of a purely hæmatogenous jaundice. There can be no doubt that the hæmoglobinæmia is the cause of the jaundice, the only question being, is the liver concerned in the formation of that excess of bile which produces the jaundice? The great mass of evidence is distinctly in favour of the view that the liver is concerned. Stadelmann† made a number of experiments in this relation on animals poisoned with AsH_3 , and came to the conclusion that the free hæmoglobin in the blood plasma circulating through the liver, determines the formation of an abnormal kind of bile, which is exceedingly rich in pigment, but poor in bile acids and in water. He explains this on the hypothesis that the liver cells—exhausted by the excessive demand on their activity which the conversion of such an enormous amount of hæmoglobin into bile-pigment entails—are unable to keep up the supply of bile acids, or even to furnish the amount of water usually present in the bile. The result is that the bile formed under these conditions is not only excessively rich in pigment and poor in acids, but is abnormally thick in consistence. It is to this inspissated condition of the bile that Stadelmann, on purely mechanical grounds—stagnation of bile in the ducts—attributes the jaundice. In another series of experiments,‡ in which a solution of pure crystallised hæmoglobin was subcutaneously injected into an animal in which a permanent biliary fistula had previously been formed, it was found that the actual volume of bile secreted in twelve hours was diminished to about one third, whilst at the same time the

* Lehrbuch der Intoxikationen, 1893.

† Arch. für exp. Path., 1883.

‡ Ibid., 1888.

bilirubin was increased three and a-half times above normal. On injecting hæmoglobin into rabbits, Stern* found that when the quantity injected exceeded about 0·02 gramme per kilo of body weight, the liver of the rabbit was not able to convert all the hæmoglobin into bile-pigment, and that a portion of the excess came away unchanged in the bile. When still larger quantities were injected, hæmoglobinuria resulted. Minkowski and Naunyn† submitted geese and ducks, after removal of the liver, to the action of AsH_3 , and found, that although abundant hæmoglobinuria was produced, no bile-pigment appeared in the urine, nor was any present in the blood. Valentini‡ discovered, in the liver-cells of frogs, in which jaundice had been produced by the action of AsH_3 , an iron containing substance evidently split off from the hæmoglobin in the process of its conversion into bilirubin.

The deduction to be drawn from these observations is that the liver is essentially concerned in the production of jaundice in all cases; even in those in which, owing to destruction of, or injury sustained by, the red corpuscle, free hæmoglobin is present in the general vascular system. Such a deduction obviously precludes a hæmatogenous origin of jaundice, in support of which little can be advanced. The conclusions in favour of a hæmatogenous derivation of jaundice based on the fact—which formerly was regarded as very conclusive—that bile pigment (hæmatoidin crystals, *i.e.*, bilirubin) is often met with in small deposits of blood which have been sealed off from the circulation, have, by most observers, been abandoned. Our present knowledge of the subject almost exclusively points to the rejection of a hæmatogenous theory of jaundice.

The fatty changes produced by poisoning with AsH_3 , are due to the rapid and copious destruction of the red blood-corpuscles. A condition of anæmia is produced, which speedily affects the nutrition of the tissues, causing fatty degenerative processes. The kidney epithelium is perhaps the first to suffer, with the result that there is abundance of fatty casts, fat-charged epithelium, and granular fatty matter speedily present in the urine. The liver cells also undergo early fatty degeneration.

The treatment of poisoning by arsenetted hydrogen is unfortunately limited to treatment of symptoms. Transfusion of human blood might be of service in severe cases.

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ON THE TREATMENT OF SYPHILIS.

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TEN years ago I made a review in this journal of the recent articles which had appeared in various British and foreign periodicals, on the treatment of syphilis, and the conflict of opinion which it revealed, although largely concerned with matters of detail, gave an interesting insight into the problems which were then attracting the most attention, and an indication of their respective approaches towards solution. A comparison with the literature of the last two years shows that the problems now under discussion are still much of the same character, but proves also that a distinct advance has been made, in that a large part of the detail has been cleared away, and that certain methods of treatment are now upheld by larger and more decided majorities.

The topics mainly in dispute are, firstly, questions of a general character, such as the possibility of aborting the disease, the proper time for commencing the treatment, and the desirability of continuing it in the absence of definite symptoms, the means for averting the occurrence of the tertiary stage, and the treatment of the patient as distinct from the specific treatment of the disease itself. The question of the sub-

cutaneous administration of mercury, in the form of injections, has reached a certain stage of quiescence, owing to the very extensive acceptance of the method by the syphilologists on the Continent, and the debates as to the most suitable form for the employment of the drug in this way have been limited mainly to the relative advantages of soluble or insoluble salts.

There are but few dissentients now to the view that mercury and iodide of potassium, if not ideally perfect remedies, are the best and necessary weapons in combating the disease. Dr. G. H. Fox (New York), however, has again raised the protest, so often heard before, against the necessity of employing them in every case, and the inadvisability of making use of them in cases in which no symptoms are detectable. Many medical men believe, he says, that syphilis is an incurable disease. On the contrary, the disease tends in every case to run a natural course and heal spontaneously. [Certainly an exaggerated and unwarrantable statement for a writer of Dr. Fox's position.—B.] If the syphilitic person has a sound constitution and is careful, the prognosis is exceedingly favourable, even when no kind of treatment whatever is instituted. [A statement undoubtedly more in accord with general observation, but still dangerous as a theoretical basis for dealing with any individual patient.—B.] Another widely spread error, he adds, is the supposition that mercury and iodide of potassium are the only means at our disposal in the treatment of syphilis. Both are certainly very active remedies, but on the other hand an unconditional confidence in them may bring serious danger to the patient. In anæmic people iron ought to be regarded as the antisiphilitic; in the scrofulous, cod liver oil is of all things the most advantageous. To free the patient from anxiety, and put him under proper hygienic conditions are in certain cases of the first importance; it is so easy to drop into the error of treating the disease and not the patient.

Another misconception is the belief that a certain time is necessary in order to complete the cure of the disease; some writers say two years, others three, etc., but the course of syphilis varies greatly in different individuals, and the time of treatment must vary according to the severity of the case.

In the discussion which followed the reading of Dr. Fox's paper, Dr. Allen objected to the sweeping character of the assertions which it contained. Mild cases of syphilis may, it is true, heal without specific treatment, but to say that all cases do so is not correct, and whoever spreads such views takes upon himself a great responsibility. As to the treatment of anæmic syphilitics with iron, mercury is often a much better tonic than iron. But there is ground for hoping that specific vaccination with a weakened serum may not only excel the effects of

mercury and iodide of potassium, but may perhaps confer actual immunity against the syphilitic poison.

Drs. Brewer and Bronson supported Dr. Fox in thinking that patients were maltreated with mercury and iodide to the exclusion of general hygienic regulations; the majority of the meeting, however, leaned to Dr. Allen's views. [It is perfectly true, as Dr. Fox states, that the hygiene of the syphilitic patient and his general health must be carefully attended to: that is a matter of general knowledge, at least among those who have any experience in the treatment of the disease, and most medical men would place the care of the general health on at least an equal footing with the exhibition of specifics. But it is an obvious error in the opposite direction to abuse the only really directly specific remedies because they themselves are at times abused.—B.]

Another most important subject was dealt with in the same meeting, namely, the desirability or otherwise of giving mercury in the early stages of the disease, and the advisability of continuing it during those periods in which there are no visible outbreak of symptoms, and when the poison is showing no manifest signs of its presence. It is, of course, an obvious corollary to the original thesis. Dr. Fox was naturally opposed to the administration of any specific unless the symptoms absolutely demanded it, and under no conditions when visible symptoms were not present; whereas Dr. Allen was of opinion that it should be given whether symptoms were present or not, in order to obviate, as far as possible, the occurrence of relapses. Dr. Otis added to this his conviction that the first appearance of symptoms ought not to be waited for; but that treatment ought to be commenced at once and steadily continued, whether they appeared or not.

On this question, which is one of very wide bearing, much has been written and continues to be written, and the opponents are divided into two well-marked camps, both of which quote very convincing statistics, and are very firm in their opinions. The desirability of introducing mercury in the first stages—that is, as soon as the diagnosis has been made—depends, for each one, on his conception of the mode of action of the drug when introduced into the organism of a syphilitic individual. The practice of continuing the administration of mercury for long periods, alternated after a time with periods during which it is entirely suspended (a method with which Fournier has especially identified himself), has many upholders, not only in France but also in this country and in America; whilst the symptomatic treatment has more adherents in the other Continental countries. The point of dispute in both these cases is evidently as to whether mercury has the power to combat the syphilitic poison wherever it may be in the organism, or whether it is simply capable of promoting the absorption and removal of the symptoms (*i.e.*,

the new growths) which the virus produces, without being able to destroy the virus itself and prevent the occurrence of relapses; and secondly, the extent to which the action of mercury may be actually injurious to the tissues. A glance over the following extracts will show the divergence and actual opposition of opinion which mark every discussion of these matters, which are obvious by not merely individual preferences, but points of fundamental importance:—

Jullien (Paris) in an address, given at the Congress in Rome last year, on "The influence of the early internal administration of mercury on the course of syphilis," quotes Diday's opinion (1862) that mercury will certainly delay the appearance of syphilitic manifestations, but that it does not prevent their occurrence nor modify their intensity when they do appear. It has been often said that mercury loses in efficacy if given too soon, and that the syphilides which have been delayed in their arrival by the medicament are then more resistant to its action. Jullien found, in an experience extending over several hundred cases, that the eruptions were certainly delayed, as Diday said, by the early use of mercury; but that if the drug was employed in the form of subcutaneous injections of calomel the delay was not one of days, as Diday found when mercury was given internally, but of months, and that when they did at last appear it was in a very modified, weakened, and rudimentary form. If, then, this weakening process could be carried out to its farthest limits, it seemed quite feasible to so affect the disease by a careful, energetic, and continuous mercurial treatment, that the weakening would be practically equivalent to a cure. Whether he has succeeded in accomplishing this result he will not undertake to say, but he is satisfied that his results obtained in this way are much more favourable than they were by the ordinary methods of treatment. It is uncertain whether the drug attacks the syphilitic virus directly, or only modifies the human organism in some way which is unfavourable to its development, but if the initial poison has its vitality reduced, the reinfections of the system which it brings about must be gradually weakened until its power is finally lost. The action may possibly be similar to that in which an artificially weakened serum is employed as a preventative inoculation. He bases his results, however, not on these theoretical considerations, but on his practical experiences, which alone are reliable in a disease which is characterised by such extraordinary periods of latency.

Schiff (Vienna) agreed with Jullien that the chancre may be successfully excised, and the operation is generally an easy one, but was of opinion that an early general treatment presented no advantages, since it did not hinder the appearance of secondary symptoms. The cases in which after an early treatment no symptoms occurred were not in any way

extraordinary, for primary lesions were sometimes followed by no after-effects whatever, even when no treatment of any kind had been undertaken. It is advisable to repeat Fournier's intermittent treatment at least two or three times a year, even when no symptoms are present. The combined mercury and iodide treatment, persisted in for several years, has proved itself the most advantageous.

Mannino (Palermo), Pellizaro (Florence), and Schwimmer (Budapest) all agreed with Jullien as to the advisability of an early and energetic use of mercury, before the secondary symptoms had shown themselves. Pellizaro believed in the excision of the chancre, but Ravogli (Cincinnati) urged the objection which has been realised so often before, that the lymph channels are already affected when the case comes for treatment. [The difficulty in deciding on the value of the excision of the primary lesion in aborting the disease, manifestly lies in the impossibility of diagnosing its syphilitic character with certainty until it is too late to prevent the virus from spreading through the system, and the vitiation of the results, from a scientific point of view, if the excision is made before this diagnosis is absolutely established—B.]

This discussion in an international assembly serves well to show that the views as to the advisability of administering mercury at once or of waiting for the occurrence of distinct symptoms of the disease, are not confined to any one country or school, but that opinions differ even among teachers in the same university.

For example, Dr. Havas (Budapest), the colleague of Professor Schwimmer, in an article entitled "In which stage of syphilis ought the general treatment to be begun?" although allowing that he considers mercury in the mucous stage and iodide salts in the later stages as specifics, entirely disbelieves in all forms of abortive treatment. In most of the cases in which the initial sclerosis has been excised the result has been negative, the symptoms having been neither diminished nor delayed in their time of appearance. Two instances which he relates are particularly interesting. In the first, that of a young lawyer who had not had intercourse for four weeks previously, a small excoriation on the prepuce was freely excised within twelve hours after a suspicious connection, but although the wound healed per primam and without any induration, the glands enlarged at the end of the third week, and eleven weeks after the operation there appeared a small pustular syphilide (*acne syphilitica*) of the scalp, roseola on the trunk, and later plaques on the tonsils and lips. The second was that of a young farmer in whom an excoriated spot on the prepuce was also freely excised within two days after intercourse, but within three days the edge of the wound hardened, and three weeks later a maculo-papular exanthem appeared. In his twelve remaining cases, although the excision was performed

within 12—30 days after coitus, the result was invariably negative. Havas has therefore come to the conclusion, in opposition to Jullien, Ehlers, Rosenthal, and Oedmansson, that the abortive treatment of syphilis is of no value, but only serves to prove how very rapidly the syphilitic virus penetrates into the organism, and that the *ulcus syphiliticum* is the first manifestation of constitutional syphilis. Although theoretically it would seem obviously reasonable to initiate a preventive treatment by the administration of mercury as soon as the appearance of the chancre has established the diagnosis of syphilis, he asserts that practical experience has not supported this view. He rejects it on the following grounds:—

(1) Even the supporters of the early preventive treatment acknowledge that the supervention of secondary symptoms cannot be prevented, but that their appearance is at best only postponed, a circumstance which is neither in the interest of the patient nor of the medical attendant.

(2) It has been shown by Diday that individuals who have been mercurialised for a long space of time are no less immune to syphilis than any others.

(3) The diagnosis of the primary sore is often doubtful, even when it is detectable, which is not always the case. The hardness alone is by no means a perfect criterion, for, as Fournier says, the chancre is not syphilitic because it is hard, but hard because it is syphilitic. And, apparently, typically hard sores are sometimes followed by no symptoms, as has been proved after long observation by competent syphilographers.

(4) Long experience has shown that in syphilitics who have been subjected to an early treatment, the secondary and also the later phenomena of the disease are not any milder than in the untreated cases; indeed, according to Kaposi, Köbner, Leloir, and his own experience, they are even more severe than in those cases in which the treatment has been begun after the outbreak of the secondary symptoms.

(5) It is well known that mercurial treatment is apt to induce constitutional affections, such as tuberculosis and diabetes. A too protracted mercurialisation of the system has been found to induce nervousness, dilatation of the stomach, kidney disease, etc.

(6) The deduction from these assertions is that the disease should not be treated until after the actual manifestations of secondary symptoms, unless the primary sore shows no inclination to heal and the disintegration of the infiltration is unusually large.

The ideal treatment is that proposed by Besnier, the saturation of the human organism by the serum which immunises animals against the syphilitic poison. Tommasoli's experiments in this direction, although not very encouraging, are by no means complete.

The key-note to Dr. Havas' objections to the early treatment of syphilis lies evidently, though he has not recognised it, in his conviction that there is great difficulty in diagnosing the primary lesion with certainty, and a consequent danger of condemning an innocent individual to the imputation of suffering from a malady which is, both from its hygienic and social aspects, a serious one. The danger is a perfectly real one, but Dr. Havas, with his great experience, must surely find that it is not of common occurrence. The vast majority of the sores present no cause for doubt to an experienced observer, and it would be surely far juster to treat the majority as soon as the disease is clearly recognised by the condition of the primary lesion, than to allow the virus to take further hold on the organism by delaying the treatment until the appearance of symptoms in which the medical man feels himself surer of his diagnosis. Dr. Havas complains of the routine (*schablonenmaessig*) procedure of those who administer mercury as soon as a patient presents a lesion on the penis. He seems to me to err in precisely the opposite direction, and just as badly, for he waits in a routine manner until the secondary symptoms are detected, ignoring the claims of those—who form the bulk of the cases—in whom the diagnosis is practically certain (within 5 per cent, according to our army surgeons), and in whom the further spread of the poison might be impeded by the administration of mercury. That mercury has such an action at this stage Dr. Havas (and those who take the side which he represents) admits, for he uses it before the outbreak of secondary lesions when the chancre is obstinate or causing destruction of tissues. And if then, why not in the milder cases which are still syphilitic even though they are not clinically so inconvenient? He is on much more logical ground when he says that although it would seem theoretically better to administer mercury at once, yet as a matter of actual experience it has been found that the symptoms which occur later in those who have been treated during the primary stage, and which have therefore been delayed, are of a more exaggerated nature than in those who have not been treated until the secondary exanthems have revealed themselves. The statement in itself is quite opposed to my personal experience, and granting that there may be some difference in the virulence of the disease in different countries, I cannot help but think that the great part of the discrepancy lies in the different manner in which the mercury is administered. If it is begun early and continued in small doses for long periods, it is the general experience in this country that the secondary symptoms, so far from being of an exaggerated character, are generally very slight, and not unfrequently are entirely absent, even when the original sore has been of the most pronounced kind. Should any appear, they generally prove readily amenable to a slightly increased dose, without any approach to

mercurialisation being produced. But if the syphilitic virus, when it has been allowed, on principle, full time to establish itself thoroughly, is cannonaded intermittently by means of inunctions or injections in a manner which prevents the steady continuous action of the drug, it is easy to conceive that although it may have been temporarily scotched, it has still quite strength enough to take advantage in the intervals of the tissues which have been weakened by large and uncontrollable doses of mercury or mercurial salts, and bring about the exaggeration of the delayed secondary symptoms of which Dr. Havas complains. I may add, too, that when mercury is administered in continuous small doses, we very rarely find signs of the nervousness, tendency to diabetes and tuberculosis, etc., which he so fears—conditions which, in my experience, are more usually met with in untreated or neglected cases—but that, as Mr. Hutchinson says, the patients usually enjoy exceptionally good general health, often better health than they had before the treatment was begun.

(To be continued.)

IN MEMORIAM—CARL LUDWIG.

BY WILLIAM STIRLING.

THROUGH the death of Professor C. Ludwig, which occurred at Leipzig on April 23rd, medicine has lost one of its greatest teachers of physiological science, and one whose discoveries in physiology have exerted, and will continue to exert, a lasting, beneficial, and practical influence on the science and art of medicine.

Carl Friedrich Wilhelm Ludwig—more familiarly known by the simple signature of C. Ludwig—was born on December 29, 1816, in Witzenhausen, in Kurhessen. He studied in the small Hessian University of Marburg, and afterwards in Erlangen, and became Doctor of Medicine in Marburg, in 1839, at the age of 22. In the latter University he became successively Prosector in the Anatomical Department (1841), "Privat-docent" of Physiology (1842), and Professor of Comparative Anatomy (1846). In 1849 he was appointed Professor of Anatomy and Physiology in Zurich. In 1855 he was invited to Vienna as Professor of Physiology and Zoology in the Josephinum, then a school for army surgeons, but since abolished. In April, 1865, he was called to Leipzig, and there he died in April, 1895, having spent in that old Saxon town thirty years of uninterrupted activity. Year after year brilliant discoveries in physiology were made in the now famous "Physiologische

Anstalt" of Leipzig, the first of its kind, and the parent of the now numerous "Anstalts" and "Institutes" which are to be found in all university towns on the Continent.

Although Ludwig "habilitirt" as a teacher of Physiology, his early training and bias led him to take a deep interest in anatomy, both human and comparative. This always reflected itself in his own work and that of his pupils. Always an anatomical and a histological investigation, where possible, formed the groundwork for the solution of a physiological problem. Dissection and microscopy were made the hand-



[We are indebted to the proprietors of the *Lancet* for this portrait.]

maidens and efficient coadjutors in physiological work. One has only to look at the beautifully illustrated monographs which have recently been issued from his laboratory to see how his keen insight found expression in the works of his pupils.

Take for instance: "Die Blut und Lymphwege im Dünndarm des Hundes," by J. P. Mall;¹ "Untersuch. ü. d. papillæ foliatæ et circ. d. Kaninchens," by O. Drasch;² "Die Vertheilung der Blutgefäße im Muskel," by W. Spatleholz;³ "Das reticulirte Gewebe," by F. Mall;

¹ "Abhand. d. Math-phys. Classe d. Kön. Säch. Ges. d. Wissen." Leipzig, 1887.

² *Ibid.*, 1887.

³ *Ibid.*, 1888.

⁴ *Ibid.*, 1891.

"Beiträge z. Kenntniss d. Füllung und Entleerung d. Herzens," by L. Krehl;¹ "Die Wege d. Blutstromes i. mensch. Ohrlaby," by Eichler;² and the more recent monographs on the blood vessels of the inner ear and those of the larynx by Speiss.³

All these, and many previous similar contributions, inspired by his genius, show the true way of physiological investigation. Up to the time when Ludwig came to Leipzig, anatomy and physiology were still taught together by Ernst Heinrich Weber. Weber died in 1878. In 1865 physiology was separated as an independent "discipline," so that Ludwig was the first professor of physiology in Leipzig.

The writer of the present article can well remember seeing Ernst Heinrich Weber as a man short in stature, with long silver locks, walking about Leipzig, supported on the arm of his tall stalwart son-in-law, the late Professor Braune. Professor His was then, as now, the professor of anatomy, but E. H. Weber always notified in the calendar, or what corresponds to it, that he would lecture on the Anatomy of the Leech.

Ludwig was, besides being an original thinker, a great teacher, a teacher in this sense, that he trained numerous pupils in his laboratory who made physiology the basis of their future researches. Early was this characteristic phase in his teaching manifested. These pupils worked in his laboratory at original research, guided by the master mind of Ludwig. Amongst his earliest pupils were A. Fick, who succeeded him in Zurich, and who is now Professor of Physiology in Würzburg; Conrad Eckhard, Professor of Physiology in Giessen; Lothar Meyer, the distinguished chemist of Tübingen, who early under Ludwig investigated the gases of the blood; Cioëtta and Westphal.

The contributions made to physiology by Ludwig under his own name are not numerous, but they are both important and "epoch-making," to use a German phrase. His "*Lehrbuch der Physiologie des Menschen*" (second edition, Leipzig and Heidelberg, 1858-61), is still a standard work on the subject, but it has also an important historical interest, for in it he lays down the views which guided his methods of research, and therein he postulates his physiological faith. The book opens with the following words: "*Die wissenschaftliche Physiologie hat die Aufgabe, die Leistungen des Thierleibes festzustellen und sie aus elementaren Bedingungen desselben mit Nothwendigkeit herzuleiten.*" His aim is to prove that "*alle vom thierischen Körper ausgehenden Leistungen eine Folge der einfachen Anziehungen und Abstossungen sind.*" In other words, he desired to get rid of vague speculations, and sought to investigate the phenomena of living things by the methods applicable to the sciences of physics and

¹ *Ibid.*, 1891.

² *Ibid.*, 1892.

³ *Du Bois Archiv*, 1894.

chemistry, and to explain their phenomena by the laws of physics and chemistry, or at least to bring them into line with the phenomena of physical science. This constant reference of physiological phenomena to the facts of physics and chemistry was the key-note of his investigations, and, along with his friends Brücke, du Bois-Reymond, and Helmholtz, to whom he dedicated his "*Lehrbuch*," these four dealt what many considered a death-blow to the doctrine of "vital force," or "vitalismus," so strongly supported by Johannes Müller. Alas! of all the four du Bois alone survives.

The bias of his mind to explain physiological phenomena by a reference to physical facts was shown in his thesis, which he presented when he became "*Privat-docent*," in Marburg—"Beiträge zur Lehre von Mechanismus der Harnsecretion" (1842), in which he gave a purely physical or mechanical explanation of the process of urinary secretion, and in subsequent years he devised numerous physical experiments to support his thesis, *e.g.*, "*Ueber endosmotische Aequivalente und endosmotische Theorie*,"¹ similar experiments with his pupil Cloëtta (1851), and his own subsequent researches on this subject.² Between his earlier research with Goll showing the dependence of the secretion of urine upon blood pressure, and the latest researches by Thompson on the effect of atropine on renal secretion, and Grigns³ on the temperature of the renal blood and urine, there are numerous contributions to the physiology of renal secretion, including that of Ustimowitsch,⁴ who showed the effect of curare in diminishing the secretion, the effect of section of the renal nerves, and also the important fact that urea—when injected into the blood vessels, the blood-pressure being very low—caused a renewed secretion of urine. The name of Ludwig, as well as that of Bowman, is indissolubly bound up with the theory of urinary secretion. Let any one read the article "*Nieren und Harnbreitung*," in "*Wagner's Handwörterbuch*"⁵—extending to twelve pages—and the similar chapter in his "*Lehrbuch*," and he will obtain some notion of the ingenuity with which Ludwig supported his thesis.

I have already spoken of his "*Lehrbuch*," which passed through two editions. After becoming engrossed with laboratory work in Leipzig, he found it an uncongenial task to issue a new edition, but any one who cares to look into it, will find therein much of Ludwig's subsequent work foreshadowed, as well as inspiration for the investigation of new problems.

In Vienna he became the fast friend of Brücke, for whom he always entertained the warmest regard. Here, too, he knew Hyrtl, and

¹ *Zeitsch. f. rat. Med.*, VIII. ² "*Sitzungsb. d. Wiener Akad.*," XX., 1856. ³ *Du Bois Archiv*, 1898.

⁴ *Arbeiten*, V. 1870, p. 199. ⁵ Vol. II., p. 626, 1844.

numerous were the anecdotes that he sometimes told of the peculiarities of the Vienna anatomist. So great was Ludwig's fame as a teacher and investigator, that in Vienna he soon formed a school of physiology, and amongst others whose names are household words, not only in physiology, but other departments of medicine, he had as pupils Czermak, at that time working with Türck on the laryngoscope; Politzer, who worked on the movements of the ear ossicles; von Recklinghausen, Kühne, Stephan, Jendrassik of Buda-Pesth, Setschenow of Odessa, Einbrodt, Preyer, Holmgren of Upsala, and many others. Thus his fame as a teacher and as an investigator was spread throughout Europe, although at that time apparently it was not the custom for Englishmen to study in foreign laboratories, although they frequently enough visited the various clinics.

One of the most epoch-making inventions of Ludwig was the recording of the oscillations of the blood pressure in animals by means of his "kymograph." Although the blood pressure had been measured in terms of a column of blood by the Rev. Stephen Hales, of Teddington, in 1727, and although Poiseuille in 1828 had used a Hg-manometer to measure the arterial blood pressure, the oscillations of the column of mercury being observed by the eye, it remained for the genius of Ludwig to convert the hæmadynamometer of Poiseuille into a kymograph, by which the oscillations were recorded on a cylinder moved by clock work. The kymograph, or kymographion¹—as he called it, was invented in 1847, when Ludwig was still in Marburg. This was indeed an epoch-making invention, and it is characteristic of the man to note in what terms he describes this apparatus in his "*Lehrbuch*."² There one finds a figure of the original form of the instrument, with a description of it in small type, and he states that "it depends on a principle which was first employed by the celebrated Watt."

Later, by a simple method, his pupil, v. Kries, now Professor of Physiology in Freiburg, measured the blood pressure in the capillaries.³

Thus he founded the graphic method, and gave it back in an improved form both to Physics and Meteorology. With the invention of the kymograph a new territory was opened up, and consequent on this followed numerous investigations by Ludwig and his pupils. The whole hydrodynamics of the circulation had still to be investigated, and, with Stephan, he carried out a purely physical investigation—"Ueber den Druck, den das fließende Wasser senkrecht zu seiner Stromrichtung ausübt."⁴ This apparatus, composed of metal tubes, with vertical manometers—designed to show how the variations of pressure and

¹ J. Müller's *Archiv*, 1847.

² *Lehrbuch*, p. 123. Second Edition.

³ *Arbeiten*, X., 1873.

⁴ *Sitzb. d. Wiener Akad.*, 1858.

velocity could be accounted for by physical means—Ludwig used to show regularly in his lectures, and he has figured the apparatus, and recorded his results in his "Text book."

Ludwig and his pupils published many researches on the variations of the blood-pressure in different parts of the vascular system in different animals, the effect of the respiratory movements of the chest wall (Einbrodt), and other conditions in the blood stream.

The influence of the nervous system on the blood stream was investigated by Ludwig and Thiry—"Ueber den Einfluss des Halsmarks auf d. Blutstrom,"¹ and in his inaugural address at Leipzig, his subject was "Die physiologische Leistungen des Blutdruckes."² In this address he gave a sketch of all that he and his pupils had done up to that time, and foreshadowed a plan for future investigations. In 1873, with Dittmar, he defined precisely the position of the vasomotor centre in the medulla oblongata.

In 1867 appeared the first volume of the famous "*Arbeiten aus der physiologischen Anstalt zu Leipzig*," issued under the unassuming title "*mitgetheilt durch C. Ludwig*," in which there is recorded a mass of work of the highest physiological and practical value, such as the writer of this notice believes has never been issued from any one laboratory, the guiding, inspiring spirit contenting himself in many cases with the simple "communicated by."

In Vol. I. of the "*Arbeiten*" we have a record of the work done in the small temporary laboratory, which includes two classical researches relating to the circulation, one the discovery of the "depressor nerve," under the title E. Cyon and C. Ludwig, "*Die reflexe eines d. sensiblen Nerven des Herzens auf d. motorischen der Blutgefäße*," accompanied by a drawing of the nerves of the neck in the rabbit, itself a testimony to the anatomical instinct of Ludwig. Whatever drawings or illustrations appeared in the "*Arbeiten*" had to be both accurate and artistic. In the same volume we have Lovén's paper, "*Ueber d. Erweiterung von Arterien in Folge einer Nervenirregung*," to wit, the effect of stimulation of the auricular nerves, and *nervus dorsalis pedis*, which produce reflex dilatation of vessels, and the discovery of the action of the *nervi erigentes*. The influence of the temperature on the heart beat by Cyon and several other classical papers, including that on the lymphatics of the central tendon of the diaphragm, by Schweigger-Seidel and himself, and Dybkowski's paper on "Absorption from the pleural cavity," make up the record of work done in the small temporary laboratory during one year.

From this time forward uninterruptedly a series of memoirs on the vascular system were issued from his laboratory and published by his

¹ "Sitzb. d. Wiener Akad., 1868.

² Leipzig, 1865.

pupils. Here Lauder Brunton¹ studied more fully the action of amyl nitrite on the blood stream.² In 1874 A. Mosso ("*Ueber einigen neuen Eigenschaften der Gefässwand*"), under the inspiration of Ludwig, began those researches on the excised kidney which proved that the blood vessels of peripheral organs may undergo variations in size independently of the central nervous system, and which led to the recording of the volume of an organ by various forms of plethysmograph, which have proved so valuable in the investigation of the functions of other organs. Schmiedeberg's³ classical paper, "*Einige Giftwirkungen am Froschherzen*," showing the action of muscarin, opened up a new sphere of investigation, viz, the action of drugs on the heart.

In no laboratory has the physiology of the heart been so thoroughly investigated as in that of Leipzig, for with Ludwig this was ever a "*Lieblingsthema*." The arrangement of the muscular fibres of the heart wall early attracted his attention, so that when Pettigrew on one occasion visited him these two found a congenial theme for discourse. The paper already referred to by Krehl, and that by Ludwig and Hesse on the shape of the heart in systole and diastole, are but an extension of the same subject. The same subject crops up again in 1884, when Conrad Gompertz⁴ investigated the arrangement of the muscular fibres of the heart of the frog. Ludwig often spoke of the masterly manner in which Gompertz carried out this thesis.

Ludwig, in this inaugural address, had foreshadowed a method which has been most fruitful in its results, not only in physiology, but in pharmacology, viz., the circulation of blood or other fluid through an "excised" organ, or through the blood vessels of "excised surviving organs" (i.e., "*Ueberlebender Organe*"), i.e., the process of "perfusion." Using the excised heart and the frog-manometer, H. B. Bowditch⁵ ("*Ueber die Eigenthümlichkeiten d. Reizbarkeit, welche die Muskelfazern d. Herzens zeigen*") showed that the frog's heart-muscle, quite independently of the strength of the stimulus, always gave a maximal contraction, i.e., it either contracted or it did not, and when it did contract its beat was always maximal, or, as it has recently been put, "all or nothing." Kronecker conclusively proved that the heart muscle could not be tetanised. It is interesting in this connection to refer to Ludwig's own words, who, in speaking of the peculiarities of cardiac excitability,⁶ says that "induction shocks which are sufficient to throw every other nerve muscle into tetanus only cause the normal heart, through which blood is circulating, to beat faster; i.e., the condition of excitability of the heart prevents it from passing into tetanus." There

Arbeiten IV., 1869, p. 101.

² Arbeiten IX., 1874.

³ Arbeiten V., 1870.

⁴ *Du Bois Archiv*,

1884, p. 244.

⁵ "*Ludwig's Arbeiten*," VI, 1871.

⁶ "*Lehrbuch*," p. 91, Second Edition.

are numerous researches on the excised frog's heart by Schmiedeberg (1870), Luciani ("Periodic Function of the Frog's Heart," 1872), Rossbach (1874), Merunowicz (1875), Kronecker, and many others.

Coats¹ showed how the work of the heart varied with stimulation of the vagus. With Dogiel,² Ludwig devised a method of measuring the amount of blood flowing out of the vessels—"Die Ausmessungen d. stromenden Blutvolumina"; and herein is described the famous "Stromuhr." A year later—"Ein neuer Versuch über den ersten Herzton"—Ludwig and Dogiel devised those classical experiments which showed the importance of the cardiac muscle in the production of the first sound of the heart, a view returned to later by Ludwig and Krehl³ in 1888. The latter also investigated the mechanism of closure of the tricuspid valve. Later, in 1886,⁴ we have Stolnikow measuring the velocity of the blood in the aorta of the dog by another modified and extremely ingenious "stromuhr."

There are also papers on "The effect of the vagus and accelerans on the heart," by Baxt (1875); on "The accelerans cordis," by Münzel (1887), Pawlow (1887), Hüfler (1888), Johansson on "Vasomotor Nerves" (1891), Krehl (1892); and on "The pulse," by v. Frey and Krehl (1890).

Besides the mechanical relations of the circulation, the exchange of gases between the blood and the air in the lungs on the one hand and the lymph on the other, together with the source and composition of the lymph itself, were also favourite subjects of investigation.

The analysis of the blood-gases begun under Ludwig by Lothar Meyer, in Zurich, carried forward by Setschenow,⁵ in Vienna, and the construction of a gas-pump for the extraction of the blood-gases, gave a new impulse to the study of the gaseous exchanges taking place in the body. These were followed by the researches of Kowalewsky, Ludwig, and Alexander Schmidt, "Über CO₂ in d. Blutkörperchen,"⁶ "Die Athmung innerhalb d. Blutes,"⁷ "Das Verhalten d. Gase, welche mit d. Blut. d. d. reizbaren Säugethiermuskeln strömen;"⁸ and by J. J. Müller,⁹ "Über die Athmung in d. Lunge," all of which are classical researches on gaseous exchanges. The CO₂ excreted by a passive and active muscle, was investigated by Minot (1876); the CO₂ in the lymph by Hammarsten (1871), Tschiriew (1874), and by Buchner (1876); the O-tension in asphyxiated blood by Manille Ide, in 1893; and the action of sugar on the blood gases by V. Harley (1894).

As to lymph secretion, we have not yet heard the last of his "mechanical theory," indeed the latest observations of Starling strongly

¹ "Ludwig's Arbeiten," IV., 1869. ² "Ludwig's Arbeiten," II., 1867. ³ *Du Bois Archiv*, 1888, p. 253. ⁴ *Ibid.*, 1886. ⁵ "Ludwig's Lehrbuch d. Phys.," p. 473. Second Edition, 1860.

⁶ "Arbeiten," II., 1867. ⁷ *Ibid.*, III., 1868. ⁸ *Ibid.*, I V., 1869.

support Ludwig's contention. The numerous experiments on lymph secretion, beginning with those of Tomsa, are classics in this chapter of physiology. Schweigger-Seidel and Dogiel showed the communication between the peritoneal cavity and the lymphatic system in the frog (1866); Genersich (1870) the absorption of lymph by tendons and fasciæ; Lesser (1871) showed how large quantities of lymph are to be obtained by movements of a limb; Paschutin (1872) studied the outflow in the forearm of the dog, while Emminghaus (1873) showed the dependence of lymph production on increased venous pressure; Budge (1874) investigated the lymphatics of the liver, which was followed by a paper by Fleischl (1874) on liver-lymph, while Merunowicz (1876) demonstrated the influence on abdominal lymph of muscarin, nicotin, and veratrin.

To Ludwig we owe the "Puncture," or "Einstich" method of injecting the lymphatics, by means of which he and Schweigger-Seidel were enabled to inject the lymphatics of fascia and tendon, and their results they published jointly in a beautifully illustrated monograph, "*Die Lymphgefäße d. Fascien und Sehnen.*" (Leipzig, 1872.)

There are also numerous investigations on the general physiology of muscle and nerve by Kronecker (fatigue and recovery of muscle, in 1871; by Tiegel (1875); by v. Kries and Sewall (1881); "On the Heat Formation in Muscle," by Meade Smith (1881); Lujankow and P. Starke (1890); Ch. Bohr on "Tetanus" (1882); Tigerstedt on "Latent Period of Muscle" (1885); v. Frey on "Compound Contractions (1888); and Bowditch on "The Non-fatigue of Nerves" (1890); by Sobieranski, Buckmaster, Lee, and others.

Many contributions were also made to the histology and physiology of the sense organs by his pupils.

By his classical researches on the sub-maxillary gland, "*Neuen Versuche über d. Beihilfe d. Nerven z. Speichelausscheidung,*" Ludwig completely modified the theory of salivary secretion and of secretion in general. With his pupils, Becher, Rahn, Spiess, and Giannuzzi, the doctrine of secretion was placed on a new basis, Ludwig having shown that secretion could not be directly dependent on blood pressure, as secretion might take place when the pressure in the salivary duct was greater than that in the carotid artery, and moreover secretion might be made to take place in a decapitated head, provided the lymphatic vessels contained lymph. One of the most interesting chapters in the "*Lehrbuch*"¹ is that on the secretion of saliva, where Ludwig points out that saliva "belongs to the juices which flow out only when the nerves going to the gland are stimulated directly or are excited reflexly." Still desiring to know more of the forces concerned in salivary secretion,

¹ *Loc. cit.* p. 328.

he set Novi¹ the task to investigate "Die Scheide-kraft d. Unterkiefer-drüse," in 1889.

Under his direction too, numerous were the contributions to physiological chemistry. Cloëtta discovered inosit and uric acid in animal tissues. Pribram determined the presence of lime and phosphoric acid in the blood by a new method, while the digestion and absorption of fat and fatty acids and their fate in the economy, were the subject of numerous investigations by Röhrig², Zawilski³, and were continued by Cash⁴, "D. Antheil d. Magens u.d. Pankreas a.d. Verdauung d. Fettes;" v. Frey⁵, "Die Emulsion d. Fettes im Chylus." The papers of Ogata⁶ and v. Anrep⁷ on allied subjects, Zebedeff⁸, v. Walther⁹, and Frank, all extended these researches on fat absorption.

Schmidt-Mulheim¹⁰ proved that after complete occlusion of the thoracic duct, the digestion and absorption of proteids, as well as their transformation into urea, takes place just as when the thoracic duct is free. Ogata showed that digestion of proteids took place in the dog after excision of the stomach (1883).

There are a whole series of memoirs on absorption of various substances from the alimentary canal, *e.g.*, sugar, and the channels by which they were absorbed, beginning with v. Mering's¹¹ paper "Die Abzugswege d. Zuckers a. d. Darmhöhle," who showed conclusively that the chyle is not essentially concerned in the absorption of sugar, that lymph contains sugar nearly in the same proportion as blood, while the blood itself—even after starvation has caused glycogen to disappear from the liver—still contains sugar. Brasol¹² showed that after excess of sugar is injected into the blood even after two minutes some has disappeared, while in two hours the blood contains its normal amount of sugar. Some at least of the sugar passes into the tissues, and some is excreted by the urine. Meade Smith¹³ returned to the subject of absorption of sugar and proteids from the stomach, while Weigert¹⁴ traced the presence of the sugar in the different tissues and juices of the body. Klikowicz¹⁵ investigated the fate of salts injected into the blood and the means by which the quantity of salts in the blood is regulated. We have numerous researches on the bile by Schmulewitsch (1868), Asp, Fleischl, Kufferatt (1880), and Vaughan Harley (1893), and on the secretion of pancreatic juice by Bernstein (1869).

Following naturally on absorption of proteids came the researches of Schmidt-Mulheim¹ showing the remarkable effects produced by injecting

¹ *Du Bois Archiv*, 1889. ² *Arbeiten*, IX., 1874. ³ *Ibid.*, XI., 1876. ⁴ *Du Bois Archiv*, 1880, p. 323. ⁵ *Ibid.*, 1881, p. 382. ⁶ *Ibid.*, 1881, p. 515, and p. 504. ⁷ *Ibid.*, 1882, p. 438. ⁸ *Ibid.*, 1890, p. 339. ⁹ *Ibid.*, 1892, p. 497. ¹⁰ *Ibid.*, 1877, p. 549. ¹¹ *Ibid.*, 1877, p. 379. ¹² *Ibid.*, 1884, p. 211. ¹³ *Ibid.*, 1884, p. 431. ¹⁴ *Ibid.*, 1891, p. 187. ¹⁵ *Ibid.*, 1896, p. 518. ¹⁶ *Ibid.*, 1890, p. 33.

so-called "peptones" directly into the blood ; of Fano¹ on the action of peptone and tryptone on blood and lymph ; of Lahousse (1889), Blachstein (1891), and Grandis (1892) on the diminution of the CO₂ in peptone-blood and the causes thereof.

Worm-Müller² and Lesser studied the effect of transfusion of blood, while Tscheriew³ studied the fate of blood introduced into the alimentary canal, or rather the daily excretion of urea from proteids in the form of blood introduced either into the blood vessels or the alimentary canal ; and Kunkel⁴ the fate of the sulphur in combination taken with the food.

Wooldridge also from 1881 onwards produced a series of remarkable papers on the chemistry of the blood corpuscles, the coagulation of the blood and intra-vascular clotting (1883-88).

The reflex functions of the spinal cord were successively investigated by Sanders-Ezn (1867), W. Baxt (1871), Stirling (1874), Ward (1880), Walton (1882), and as bearing on this we have the results of laborious work by Birge, under the direction of Gaule, who counted the number of nerve fibres and cells in the spinal cord and nerve roots of the frog⁵ ; W. P. Lombard⁶ (reflex muscular contractions) ; Sirotinin (1887) and De Boeck (1889) on punctiform stimulation of the cord.

The course of the afferent and efferent spinal impulses was investigated by Miescher,⁷ now Professor of Physiology in Basel, "Zur Frage d. sensiblen Leitung i. Rückenmark," by Nawrocki,⁸ Woroschiloff and Owsjannikow.⁹ The course of the vaso-motor nerves was investigated by Nicolaides,¹⁰ while Hafiz and Gaskell (1876) investigated the influence of nerves on the blood vessels, or rather the changes in the blood stream in muscles by stimulation of their nerves, while v. Frey studied the mode of action of the vaso-dilator nerves of the sub-maxillary gland.

Gaglio investigated the lactic acid of the blood (1886), and Siegfried the presence of this acid in other tissues (1894).

The exact peripheral distribution of nerves was always of interest to Ludwig, and he often quoted the remarkable researches of Türck¹¹ of Vienna on the sensory nerves of the dog. Indeed he reproduces Türck's figures in his text book. In them one sees foreshadowed the recent work of Sherrington. He had the highest regard for Türck as an accurate observer.

On only one or two subjects do I not remember to have seen any detailed researches, viz., on the physiology of the cerebrum and cerebellum. Whether it was he thought the methods used were too crude, or for whatever cause, investigations on cerebral physiology as at present

¹ *Ibid.*, 1881. ² *Arbeiten.*, VI., 1871. ³ *Ibid.*, VIII., 1873. ⁴ *Ibid.*, X., 1875. ⁵ *Du Bois Archiv*, 1882, p. 435. ⁶ *Ibid.*, 1885. ⁷ *Arbeiten V.*, 1870. *Ibid.* VI., 1871. ⁸ *Arbeiten V.*, 1870. ⁹ *IX.*, 1874. ¹⁰ *Du Bois Archiv*, 1882. ¹¹ p. 160, Second Edition.

conducted—viz., chiefly by electrical stimulation and excision—did not, so far as I recollect, engage much of his attention.

The strongly morphological bias of Ludwig's mind has already been referred to, and with many of his pupils he carried out histological researches on the salivary glands (Giannuzzi), pancreas (Ogata), liver (Budge, Fleischl), testicle (Mihalkowicz), skin (Stirling), cerebellum (Beever), muscle, intestinal vessels (Heller), blood parasites or würmchen (Gaule); in fact, on almost every organ in the body.

Many of these histological researches were carried out under the superintendence of his able histological assistants, Schweigger-Seidel, Schwalbe, Fleischig, and Gaule, while the chemical side was under the direction of Dreschel, and, latterly, of Siegfried. Kronecker, v. Kries, and v. Frey, in their capacity as assistants, gave most valuable aid to those working in the laboratory. Not to be forgotten is the invaluable aid of Salvenmoser when apparatus had to be devised and fitted up.

It was while Fleischig was assistant to Ludwig that he carried out that series of investigations on the time when nerve fibres become medullated, which have made his name famous.

On reviewing Ludwig's work one sees in it not only the directing hand, but also how it was planned by a master mind, so that pupil after pupil amplified and extended the work of his predecessors, and thus secured that continuity of investigation which has produced such prolific results.

Apart from the separate publications cited above the work of Ludwig and his pupils will be found in the following publications: J. Müller's *Archiv* (1843-49); Henle and Pfeufer's *Zeitsch. f. rat. Med.* (1844-55); *Verhandl. d. Züricher Natur. Gesellsch.* (1852-55); *Sitzb. d. Wiener Akad. d. Wissensch.* (1856-64); *Ber. d. k. Sächs. Gesellsch. d. Wissensch. zu Leipzig* (1865-94). During the years 1866-77 the work of Ludwig, which was always communicated to the "Sächsische Akademie," was reproduced separately as the famous "Arbeiten aus der physiologischen Anstalt zu Leipzig," i.e., for eleven years (Jahrgang 1—11), and in these will be found many standard papers on the subjects to which these papers relate. These memoirs were always well illustrated, for the "Akademie" has a fund left by J. Alexander Jablonowski for the publication of scientific works.

With the foundation of *Du Bois Reymond's Archiv* in 1877, Ludwig agreed to publish his work, and that of his pupils, in that journal, so that the famous "Arbeiten" ceased to be sold as a separate work, and the fruits of his labours, and those of his pupils, must therefore be sought for in that journal from 1877 onwards.

It is sincerely to be hoped that all his works, and those of his pupils, will be reproduced in a permanent and easily accessible form.

On the 15th October, 1874, Ludwig celebrated his silver jubilee as Professor of Anatomy and Physiology, on which occasion, as is usual in Germany, some of his pupils presented him with the well-known *Beiträge z. Anatomie und Physiologie* als Festgabe dedicated to Carl Ludwig. Few who were present at the subsequent dinner will ever forget the reunion of old friends and pupils that took place on that day. Again, on his seventieth birthday, he was the recipient of a similar honour.

He visited England but once, along with Kronecker, who acted as his guardian and friend. Ludwig always professed himself as unable to stand the sea voyage. Besides numerous honours conferred on him by learned societies abroad, and by the King of Saxony, he was an honorary member of the Royal Society and Physiological Society, and he received the Copley Medal of the former society.

In his latter years he was fond of making models to illustrate his lectures, and ever and anon one saw the strongly pronounced mechanical bias crop up in the construction of apparatus for the solution of some problem or other.

As a teacher of physiologists he stood *facile princeps*. To use the words of his former assistant, Professor Hugo Kronecker, of Berne—"No physiologist ever had so many pupils of all nationalities as Ludwig; more than two hundred scientific men owe to him at least a part of their scientific education, and each one of them fell under the influence of his enchanting personality." In every country of the world is to be found some one who has worked in his laboratory, and from 1865 onwards there was to be found a constant succession of English and Americans and other nationalities who either wished to become physiologists, or who wished physiology to be the basis of their future pursuits in practical medicine. "Amongst his English and American pupils may be mentioned, in the order of time, Lauder Brunton, Coats, Bowditch, Rutherford, Moseley, Ray Lankester, Stirling, Minot, Gaskell, Ward, Cash, Sewall, Meade-Smith, Wooldridge, Walton, Beevor, Buckmaster, Carlaw, F. S. Lee, F. Mall, W. H. Thompson, and Vaughan Harley."

The record of pupils has no reference to the ordinary students of medicine who listened to his lectures, but refers to those who, after completing their medical education, came to Leipzig to carry out original researches under his guidance, and to perform those fundamental experiments in physiology, many of which, owing to well-known reasons, could not be performed in this country. Moreover, in a laboratory like that of Ludwig's, where, perhaps, ten men at a time were carrying on different researches, it was an education to have the privilege of working there.

When one remembers that Ludwig's services were open to all who came to his laboratory inspired with the desire to do original work, and

¹ *Lancet*, May 11, 1895

when one also remembers that laboratory fees or fees for apparatus were unknown, one can form some idea of his goodness and kindness. Moreover, when one recollects the pains he took to instil into one those precise methods of experimenting, and the necessity for the frequent confirmation of an observation, and the self-sacrifice on his part that all this involved, one cannot wonder that all his pupils revered him and honoured him as few teachers have ever been honoured or revered. There was a fascination about his manner and his discourse which was quite bewitching.

To listen to his talk on subjects outside physiology, whether on matters social, political, personal, or anecdotal, was to some of us a rare intellectual treat. Personally I shall ever retain an undying recollection of all his goodness and kindness. For many years it has been my privilege to visit him once a year, and happy were the few days we spent together. He had always something new to show or to tell one. Often while we were talking would Salvenmoser, his attached and valued steward—be preparing some experiment which had been worked out during the previous year. His unfailing courtesy was known to all, while his indefatigable energy remained unimpaired until the last. Five weeks before he passed away he conducted the examinations for the degree. This was the last act of his academic life. “Die Uhr stand still, der Zeiger fiel. Es war vollbracht.”

CHRONICLE.

Medicine.

UNDER THE CHARGE OF JULIUS DRESCHFELD, M.D., F.R.C.P.

HERRINGHAM (W. P.). “On primary cancer of the pancreas.”—*St. Bartholomew's Hospital Reports*, Vol. XXX., 1894, p. 5.

In this paper the author reviews the symptoms in seventeen cases of cancer of the pancreas, of which very brief notes are given, along with the results of post-mortem examinations. The following are the conclusions at which he arrives:—

(1) That when a patient who suffers from deeply-seated pain in the epigastric or hepatic region, along with progressive emaciation, but with-

out signs definitely indicating gastric cancer, has jaundice and dilatation of the gall bladder without a history of biliary colic, by far the most probable diagnosis is that he has primary cancer of the pancreas, and that this diagnosis is not much affected by the state of the liver, which may be large or small, and may or may not contain palpable cancerous growths.

(2) That if the gall bladder be not dilated, the diagnosis must remain uncertain.

RADASEWSKY (MAX). "On the muscle diseases of the auricles of the heart."—*Zeitschrift f. klin. Med.*, Bd. XXVII., H. 5 u. 6.

HITHERTO, on microscopical examination of the cardiac muscle, attention has been directed chiefly to the ventricular wall, and comparatively little attention has been paid to the microscopical condition of the walls of the auricles. It is generally allowed, that the rhythmic co-ordinate contractions of the heart commence at the auricles, and hence the author regards it as very probable that in certain cases of irregular action of the heart, the changes must be sought in the muscle walls of the auricles and not in those of the ventricles. In some cases of myocarditis affecting the ventricular septum, there has been no arrhythmia of the pulse. The author records the results of the careful pathological examination of the cardiac muscle in six cases of heart disease.

Case 1.—Clinical diagnosis: Aortic insufficiency and stenosis; sclerosis of the coronary arteries, and sclerosis of the large peripheral arteries. In addition to the valvular lesion, the pathological examination revealed an increase of fibrous connective tissue in the cardia muscle, which appeared to commence from the adventitia of the vessels, and also from the sub-pericardial connective tissue, and to a much less extent from the sub-endocardial connective tissue. There was a diffuse sclerosis of the vessels of moderate degree. The changes found in the cardiac muscle consisted of an increase of the interfascicular connective tissue, and may be described as a diffuse myo-fibrosis. The changes were most marked in the auricles and left ventricle.

Case 2.—Clinical diagnosis: Chronic myocarditis; infarction of the lungs. The heart's action was irregular and rapid. The autopsy revealed: sclerosis and atheroma of the aorta; lipomatosis cordis; dilatation of the right ventricle. Microscopical examination showed proliferation of the interstitial connective tissue, not only between the bundles of muscle fibres, but also between the separate fibres. The changes were most marked in the right auricle, least marked in the left ventricle.

Case 3.—Clinical diagnosis: Dilated right heart; hemiasystole; emphysema. At the autopsy the heart was greatly enlarged. Microscopical examination revealed great increase of interstitial connective tissue between the muscle bundles, and also between the muscle fibres (marked diffuse inter-fascicular and inter-fibrillar fibrous degeneration) of the right auricle. The anterior part of the auricular septum and the left auricle were affected to a less extent. The muscle of the ventricle and of the ventricular septum was normal.

Case 4.—Clinical diagnosis: Influenza; pneumonia; acute pericarditis; acute cardiac failure. Post-mortem examination showed that the heart was greatly enlarged, the valves were normal, there was recent pericarditis and marked atheroma of the vessels. The muscle of the auricle appeared almost normal, but there was typical localised indurative myocarditis of the ventricles, especially the left.

Case 5.—Clinical diagnosis: Chronic myocarditis. Post-mortem examination revealed chronic indurative myocarditis, with great hypertrophy of the left, moderate hypertrophy of the right ventricle, and dilatation of all the cavities of the heart. Microscopical examination showed a diffuse fibrous degeneration of the cardiac muscle, most marked in the right auricle, and only slight in the left auricle. The auricles were affected to a much greater extent than the ventricles.

Case 6.—Clinical diagnosis: Stenosis and insufficiency of the mitral valve. The autopsy revealed cardiac enlargement and mitral disease. The microscopical examination of the cardiac muscle showed marked diffuse fibrous degeneration (interfascicular and interfibrillar) of the auricles, while the muscle of the ventricles was comparatively normal.

The microscopical condition of the cardiac muscles in diffuse fibrous myocarditis is then described in detail.

The author concludes, from his pathological observations, that besides the disseminated localised indurative myocarditis there is also a diffuse fibrous degeneration of the cardiac muscle, to which hitherto but little attention has been paid. This diffuse fibrous degeneration is frequently much more marked in the walls of the auricles than in the ventricular walls.

The author then considers the clinical importance of this disease of the muscle of the walls of the auricle.

In Cases 2, 3, 5, and 6 there was extensive fibrous degeneration of the muscle of the auricles; in Case 5 there was also degeneration of the ventricular muscles; whilst in Cases 2, 3, and 6 the ventricular muscle was but little affected. In these cases there was a high degree of irregularity and arrhythmia of the heart's action. But in Case 4 there were only slight changes in the auricle, but marked degeneration of the

ventricular muscle. In this case the heart's action was regular and rhythmic. The author believes that when extensive diffuse fibrous degeneration of the muscle of the auricle occurs, with or without disease of the ventricular muscle, the heart's action is irregular. But when only slight changes occur in the auricular muscle, with or without extensive changes in the ventricular muscle, the heart's action is regular. He concludes that in chronic myocarditis the marked irregularity of the heart's action is due to disease of the auricles, and cannot be explained by ventricular disease.

BACHUS (G.). "On cardiac affections in masturbators."—*Deutsches Archiv f. klin. Med.*, Bd. LIV., H. 2 u. 3.

It is well known that frequently cardiac affections are met with in those forms of neurasthenia which are connected with sexual excess. The patient complains of marked subjective symptoms, palpitation, a feeling of fear; rapidity, increased force, irregularity, or slowness of the heart's action. As a result of the excitable condition of the heart, enlargement may follow, just as occurs in Graves' disease. Curschmann has often met with cases of palpitation in masturbators, and has also sometimes observed cardiac hypertrophy, which he connects with masturbation.

Bachus reports six cases of cardiac enlargement occurring in masturbators. The enlargement was mostly to the left and right [in none of the cases, however, was it very great]. Five of the six patients suffered from palpitation. The author points out that anæmia, disease of the valves of the heart, of the cardiac muscle, of the arteries, and of the kidneys, may be excluded, as causes of the cardiac enlargement, in the cases which he reports. Graves' disease may also be excluded. He regards the cardiac enlargement as the result of the increased work of the heart. This he believes to be connected with masturbation, and to be produced by the increased rapidity and force of the heart's action, that occurs both during the sexual act and also at other times. In cases of heart affection due to masturbation, the patients are young individuals who complain of cardiac troubles, a feeling of fear, and very troublesome palpitation. The heart's action is always altered; all kinds of changes are met with; it is more frequently rapid than slow, more often increased than diminished in force, and very often markedly irregular. The heart is increased in size, more frequently both to the right and to the left, seldom to the left only. The sounds are unaltered, as a rule. The pulse shows changes corresponding to the altered heart's action. The tension and volume are not characteristically altered. Excess in beer drinking, smoking, muscular strain, and myocarditis, give rise to similar symptoms, and must be excluded before a diagnosis can be made. The history of masturbation, then, furnishes an explanation of the symptoms.

PAPERS ON DIABETES MELLITUS.

HIRSCHFELD (F). "On diabetic coma."—Report of the meeting of the "Verein für innere Medicin zu Berlin."—*Münchener medicinische Wochenschrift*, p. 406, April 23 and May 14, 1895.

THE prognosis, whether in a diabetic patient coma will occur or not, is as yet quite uncertain, but the observations of the author on acetonuria throw some light on this point. Hitherto the large amount of acetone in the urine has been referred to the increased destruction of albumen in the organism, as acetonuria occurs also in fever, exhausting disease, and during hunger. But the author has succeeded, in all these cases, in causing the acetonuria to disappear by giving carbohydrates in large quantities. In diabetes the organism has lost the power of burning up the carbohydrates and acetone, and this power appears to be lost to a greater degree the nearer the approach of coma. This the author was able to observe in seven cases; sometimes shortly before death the amount of acetone increased up to 4 grammes in 24 hours.

A definite cause for the onset of coma has not yet been discovered. Still the observations of the author and others have shown that excessive muscular exertion, insufficient feeding (for example by rigid meat diet); also narcosis, and carbuncle, or gangrenous affections have some influence in the development of coma. An attack of influenza may give rise to the onset of coma.

In typical cases the diagnosis of diabetic coma is easy. The patient suddenly complains of gastric troubles, then headache, and a feeling of shortness of breath. These symptoms increase, and death occurs in from 2 to 10 days. Abortive cases are very frequent, according to the author, and end in recovery. Salicylic poisoning, conditions of exhaustion and apoplexy, may be confused with diabetic coma. In such cases the development of the symptoms, the presence of acetone or aceto-acetic acid, and oxybutyric acid in the urine are points of importance.

As regards treatment the author advises good nourishment, carbohydrates in moderate amount, fat in large quantities, and also alcohol. When the patient has become comatose, as yet only the intravenous injection of alkaline solutions, as recommended by Stadelmann, has been of any service. Glycerine may also be given.

In the discussion which followed this communication, Hirschberg mentioned a case in which an operation for cataract without the use of any anæsthetic, had given rise to coma, which proved fatal.

Fränkel stated that he had not seen any good result from the injection of alkalies.

Stadelmann pointed out that it was necessary to give very large doses of alkalies, when symptoms of coma appeared; he gives sodium bicarbonate up to 30 grms. (about 460 grains) daily.

Hirschfeld stated, in reply, that he did not consider acetone as the cause of the coma. The exact cause is not yet known. He employs sodium bicarbonate in the form of powders.

In the continued discussion on May 6th (reported in the *Münchener medicinische Wochenschrift*, May 14th), Klemperer referred to 21 cases of diabetic coma which had been treated in Leyden's clinic during the last eight years. Special attention had been paid to the examination of these cases with respect to the theory of acid poisoning. In all of the cases there was a great increase of the acids in the blood, but he does not regard acid accumulation in the blood as the cause of the coma. He regards the marked destruction of albumen as more important. In other diseases, with great destruction of albumen, coma occurs without the accumulation of acids in the organism. The administration of alkalies was without influence on the course of the coma, still it is of some importance in other respects in the treatment of diabetes. He regards it as the most important point, to try to check, as long as possible, the destruction of albumen by giving large quantities of fat. Experiments with many new forms of sugar have led to no results.

Leyden drew attention to Leube's method of the subcutaneous application of fat.

Senator, also, has had no result from the alkalies.

Hirschfeld recommends butter and cream as the best forms of fat for diabetic patients.

JACOBY (C.). "On artificial (experimental) renal diabetes."—*Archiv für Experimentelle Pathologie und Pharmakologie*, Bd. XXXV., Heft 2 u. 3.

JACOBY has succeeded in producing a marked polyuria with glycosuria in a series of experiments on animals by the administration of caffen sulphonic acid in doses of 0.1—0.3 grammes. The experiments were performed on rabbits. In some cases the drug was administered subcutaneously or introduced by a sound into the stomach, but as a rule it was injected directly into a vein. In some rabbits, however, though the experiment was performed in the same manner, the diuretic action was very slight, and there was no sugar in the urine. For this difference, at first, no cause could be found until it was noticed that the feeling of the animals was not the same. In the cases in which there was a marked diuresis, the animals had been fed with roots (carrots and turnips); whilst in those cases in which the diuretic action had been slight, the food had consisted chiefly of bran, bread, and hay. Also when the animals were fed with roots, caffen, and theobromin, as well as caffen sulphonic acid, gave

rise to diuresis and glycosuria. Further experiments showed that when the animals were fed with roots, benzoate of caffein and soda and also diuretin (theobromin and sodium salicylate) gave rise to diuresis with glycosuria. Feeding with roots alone, without the administration of the drugs above mentioned, did not produce glycosuria.

The sugar excretion stood in direct relation to the diuretic action of these drugs. If sufficient sugar was present in the blood this was excreted in the urine, when, by the action of the diuretic, a considerable increase of the secretion of the kidneys was produced. It is intelligible that by feeding with large quantities of roots, the accumulation of sugar and water in the organism is favoured, and that by simultaneous development of marked diuresis an excretion of sugar easily occurs; whilst by feeding with bran, bread, and hay, which are not suitable for diuresis and sugar excretion, the caffein preparations only give rise to slight diuresis, and glycosuria does not occur.

In the original the details of the above experiments are given. The author concludes that the caffein group of substances (caffeine sulphonic acid, caffeine, theobromin) are able to give rise to diuresis in rabbits, with excretion of sugar in the urine, and that the latter has its origin in the increased secretion, and must be regarded, therefore, as a renal diabetes.

EBSTEIN (W.) "Traumatic neurosis and diabetes, with special reference to the accident assurance laws."—*Deutsches Archiv f. klin. Med.* Bd. LIV., Heft 2 u. 3.

EBSTEIN first reports two cases of diabetes following neuroses. The first patient was a man aged 45, whose previous health had been good. In a railway accident he suffered from general concussion, and directly afterwards became very ill, the symptoms being those of bodily and mental shock. At first spinal disease was suspected, but after an examination Professor Ebstein regarded the symptoms simply as those of traumatic neurosis. The symptoms persisted, and six years after the accident, whilst the patient was under observation in Ebstein's klinik on account of his nervous symptoms, it was discovered that he was suffering from diabetes mellitus. The urine had a sp. gr. of 1035 to 1040; the daily quantity varied from 1,100 to 2,100 cc.; and the amount of sugar from 4·7 to 6·8 per cent. Occasionally a small quantity of acetone and aceto-acetic acid was present. At a later date the mental condition became very dull, the left leg became paralysed and the left arm weak, and afterwards rigid. The right leg also became feeble, and the knee-jerks became increased. The patient died, and an autopsy showed that the paralytic symptoms were due to patches of cerebral softening, the result of atheroma of the cerebral arteries.

In a second case the patient was very stout and had suffered from gout. After a fall, symptoms similar to those of traumatic neurosis developed, and about six months later symptoms of diabetes were discovered.

Both patients were very stout, and it has often been noted that obesity has preceded diabetes. Demange has found this condition in 45 out of 100 cases of diabetes.

In both of these cases the onset of the symptoms did not occur for a long time after the accident.

The earlier the diabetic condition is observed after an accident, and the greater the evidence that the symptoms were not present before the accident, the greater is the probability of a connection between diabetes and the injury.

Asher has reported a case in which the patient suffered from a trivial accident. Symptoms followed which were looked upon as those of traumatic neurosis. Three weeks after the accident symptoms of diabetes mellitus appeared.

Ebstein also records four cases of diabetes, following injury to various parts, in which no symptoms of traumatic neurosis were present. Abstracts are added (in tabular form) of fifty cases of traumatic diabetes collected from medical literature.

Numerous cases have been recorded in which diabetes has followed an accident, and has appeared to have been caused thereby, but there are few cases on record in which diabetes has occurred along with, or as a consequence of traumatic neurosis.

In traumatic diabetes, no doubt individual predisposition to the disease is an important factor. The occupation, age, and sex of the patients appear to be of no importance. Injuries to the head appear to be followed by diabetes more frequently than injuries to other parts; in one-half of the fifty cases of traumatic diabetes collected by Ebstein, the head was the seat of injury. In other cases, injuries to the neck, liver, region of kidney, pubes, etc., have been followed by diabetes. From the fact that only an exceedingly small proportion of injured persons become diabetic, one must conclude that there exists some peculiarity in the nature of the injury, or some peculiarity in the individual in cases of traumatic diabetes. Only the second supposition is tenable. Also in traumatic neurosis a neuropathic taint is present, which plays a very important part.

The numerous cases recorded in medical literature show that between trauma and diabetes, as well as between trauma and functional disturbances of the nervous system, there exists a causal relation. Ebstein thinks that between traumatic neurosis and diabetes there exists a connecting link. In only a few cases of traumatic neurosis does diabetes

develop. Most cases of traumatic diabetes appear to occur quite independently of traumatic neurosis.

The fact that traumatic diabetes may develop not only after, but at the same time, or almost at the same time, as the functional traumatic neurosis leads one to conclude that this form of traumatic diabetes must be regarded not as a result of the neurosis, but that both—neurosis and diabetes—must be regarded as the direct result of the injury.

R. T. Williamson.

Surgery.

UNDER THE CHARGE OF THOMAS JONES, M.B., B.S., F.R.C.S.

RIOBLANC. "Results of Gritti's operation."—*Lyon Medical*, April 21, 1895.

M. RIOBLANC brought before the Lyons Medical Society a young soldier on whom he had performed Gritti's operation for osteomyelitis following a compound fracture of the tibia, after other operations, such as drainage and removal of fragments, had failed.

Six and a half months after the operation there was a nicely rounded stump with a posterior cicatrix well out of danger, very little muscular atrophy, powerful movements with wide range of movement, no displacement of the patella which was firmly fixed to the femur. The patient had an apparatus constructed so that the weight of the body bore directly on the stump, but there was an arrangement at the upper part of the apparatus to obtain additional support from the ischium if necessary, by diminishing the thickness of the cushion supporting the stump.

M. Rioblanc in his paper reviewed the history of this operation, proposed by Gritti and published in 1857, and regretted that it had been allowed to fall so much into disuse.

The operation has been criticised as useless, complicated, difficult, dangerous, and incapable of attaining the desired end, and the author mentions the names of several of the most prominent critics of the method. M. Rioblanc points out, however, that these criticisms were mostly levelled at the operation before the introduction of antiseptic methods into surgery, and he thinks the time has come to reconsider the question under the new conditions. Several German surgeons during the last few years have performed the operation and declare themselves highly satisfied with it.

M. Rioblanc has been able to collect 85 cases of Gritti's operation, three-fourths of them since 1880. The mortality of these is 18 per cent, or 14 per cent taking into account only the cases since 1880, that is, since the general use of antiseptics. This is far below the figures of Salzmänn (48 per cent), whose statistics, however, are not very reliable; still the mortality is high enough.

The author believes the mortality is due to causes quite apart from the method employed, for example cancerous cachexia, traumatic shock, septicæmia present at the time of operation, alcoholism, senile gangrene, etc., and that the operation of Gritti does not present any special gravity. He shows that the fear of non-union or displacement of the patella from the femur is unfounded, this only occurring when there is osteomyelitis and necrosis of the femur. Abscess of the bursa patellæ only occurred once in the series of cases, and had no permanent ill-effect.

Contrary to the opinion of Le Fort, Gurlt, Koch, etc., Mosetig-Moorhof declares that the patellar stump of Gritti supports the weight of the body as well as any other bone covered with skin.

M. Rioblanc has found in his collected cases the fact of bearing weight directly on the stump mentioned in nineteen. The result is enduring, for patients have been seen at different periods after operation. One of Ried's, seven years after the operation, worked all day standing and carried about sacks of flour.

The author considers Gritti's operation much superior to Carden's, and refers to Hahn's demonstration at the Congress of Magdebourg of some inconveniences of the latter method.

M. Rioblanc does not wish to put forward this operation in place of disarticulation through the knee. The latter shows excellent statistics (Delorme, Poncet); but when the absence of sufficient soft parts to cover the condyles prevents the disarticulation method, he thinks Gritti's operation much to be preferred to an amputation through the lower third of the thigh, or to Carden's operation.

He remarks in passing that Sabanejeff's operation, which consists in fixing to the cut surface of the femur a section of the tibia, including the anterior tuberosity and the insertion of the patellar ligament, and which requires a much larger amount of healthy skin and the integrity of the upper epiphysis of the tibia, will find a much more limited range of use than the amputation of Gritti.

As regards the practical details of the operation M. Rioblanc recommends Bauden's method, which makes the lower edge of the incision two or three fingers' breadth from the tip of the patella. M. Rioblanc considers it essential (1) to saw the femur fairly high to facilitate the adaptation of the patella. [Is not this a special feature of Stokes' modification?] (2) To suture the patella to the femur. He believes

ivory pegs to fix the patella a mistake, as they may cause a rarefaction of osseous tissue and prevent fixation. (3) To prevent the contractions of the quadriceps and immobilise the stump completely, as for a fracture, the hip-joint being fixed for five or six weeks. (4) To observe carefully aseptic rules, as the separation of the patella from the femur is almost invariably the result of osteomyelitis and necrosis of the extremity of the femur.

LAMBOTTE. "Complete luxation of the two iliac bones with rupture of the rectum. Immediate intervention. Cure."—*Annales et Bull. de la Soc. de Méd. d'Anvers*, March, 1895.

A GIRL, seven years old, was run over and taken to hospital, where she was seen shortly afterwards by M. Lambotte. The wheels of the vehicle had gone over the pelvis, and caused complete dislocation of the iliac bones, with a separation at the symphysis pubis of 10 or 12 cm. An immense tear extended from the anterior commissure of the vulva right back to the coccyx. The wound bled profusely, the bladder formed a hernial projection, and faecal matters were flowing freely from the wound. All the injured region and hypogastrium on both sides showed bluish ecchymoses and emphysema.

Under an anæsthetic the wound was discovered to commence at the anterior commissure of the vulva: it passed to the right of the bladder, which was intact; further back the vagina had been torn away from the right labium majus; on the left it was driven back with the urethra, and remained attached to the vulva. The rectum was torn to the extent of 4 cm., the sphincter included. There was an incomplete fracture of the right ischio-pubic ramus. The rectum was carefully cleaned out by a copious boric irrigation; the bladder was emptied, and a long transverse incision made above the pubis from one crural region to the other, to disinfect the subcutaneous tissues, which were already emphysematous. Two small incisions below allowed access to the symphysis. Two thick silver wires were passed through the pubis, and the bones replaced without difficulty. Four sutures were placed in the coats of the rectum; the vagina was not sutured. The perineal rent was drained by gauze at the level of the vagina.

The wounds remained perfectly aseptic; twenty-eight days after the accident the pelvis was quite firm, and the child could walk without limping. The tear of the rectum healed without sinus. A month after the operation M. Lambotte removed the silver wire from the symphysis, the cure being perfect and complete.

COLEY (W. B.). "The operative treatment of hernia in children, with a report of one hundred and thirty-three cases."—*American Journal of the Medical Sciences*, May, 1895.

UNTIL the publication of the more recent methods of Macewen, Championnière, Bassini, and Halsted, the results of the operative treatment of hernia were so often failures that operations began to be looked on with a distrust which has not even yet disappeared.

Some surgeons state that all cases of hernia in children can be cured by trusses, but Dr. Coley thinks that if the cases had been properly followed up it would be found that it was not so, but that in a very large proportion cure was not obtained.

Dr. Coley thinks the following to be indications for operation in children:—(1) Cases of adherent omentum (rare in children); (2) cases complicated with reducible hydrocele; (3) cases irreducible or strangulated; (4) cases unable to obtain the care requisite to successful mechanical treatment; (5) cases where mechanical treatment has been faithfully tried for a number of years without benefit.

Since December, 1891, Dr. Coley has performed the operation for radical cure in 133 cases under 14 years of age. Five were cases of femoral hernia, four umbilical and ventral, and 124 inguinal (10 females and 114 males). Ligation of the sac and suture of the canal, without transplanting the cord, were employed in 10 cases.

In 114 cases Bassini's method was employed, and in 112 of these the same technique was observed in every detail, which makes the analysis of them very valuable. The following is Dr. Coley's description of Bassini's method as used by him:—

(1) "The *external incision* begins at a point nearly or quite on a level with the anterior superior spine, continues obliquely downwards parallel with and about one-half an inch internal to Poupart's ligament, and ends at the centre of the external ring."

(2) "The incision is rapidly carried down until the aponeurosis of the external oblique is freely exposed for a distance of two and one-half to three inches; a director is then passed through the external ring just beneath the aponeurosis, and the aponeurosis is divided well above—*e.g.*, one-half to one inch above the internal ring."

(3) "The cut edges of the aponeurosis are held up with forceps and dissected free from the underlying muscles as far as the edge of the rectus internally, and externally until the shelving portion of Poupart's ligament has been clearly exposed."

(4) "The sac and cord are then isolated *en masse*, and this is best accomplished with the fingers and blunt-pointed curved scissors. If the peritoneal layer of the sac is first reached, the dissection is easy, rapid, and bloodless."

(5) "The cord and vessels of cord are now separated from the sac, and this, too, is best done with the fingers. The separation is carried high up within the internal ring, and the sac is ligated or sutured at the place where it merges into the general peritoneal cavity."

(6) "The cord is held up, and the edges of the aponeurosis rolled back, while from three to five buried sutures are introduced beneath the cord. These are best introduced from within outward, and should include the internal oblique and transversalis muscles, the transversalis fascia (and sometimes the edge of the rectus) on the inner side, and the deep shelving portion of Poupart's ligament on the outer side. The lowermost suture should embrace the conjoined tendon."

(7) "The cord is now replaced, and the cut aponeurosis is closed over it by means of a continuous suture, extending as near the pubis as possible, without causing undue constriction of the cord."

(8) "Closing the skin wound with interrupted sutures without drainage completes the operation."

Dr. Coley says this is not at all complicated or tedious in practice. He has done the entire operation in fifteen minutes. He believes the character of the suture-material for the buried sutures to be of the highest importance, and recommends kangaroo tendon. He mentions cases where silk and catgut have led to the formation of troublesome sinuses. Of the 112 cases operated on by Dr. Coley by the Bassini method with kangaroo-tendon sutures, primary union occurred in 109, and in two of the other cases suppuration was very slight and superficial. He had only one death—a child of five years—due to double pneumonia, following measles five weeks before.

Final Results.—All but two of the cases have been traced. Not a single case has worn a truss, and there has been no case of relapse. Four date back two and a half to three years; 10, two to two and a half years; 18, one and a half to two years; 27, one to one and a half years; 20, six months to one year; 45, less than six months.

CLARK. "The surgical indications in trigeminal neuralgia."—*New York Medical Journal*, April 20, 1895.

THE author believes that the surgical indications in trigeminal neuralgia have been slowly but surely developing during the last few years. He mentions the names of several American medical men who have recently reported cases, with rapid recovery, permanent relief from pain, decided improvement in general health, and no special permanent interference with function in parts supplied by the nerves.

Among the operations mentioned are the following:—Removal of second division of fifth nerve as far as foramen rotundum, and breaking up of Meckel's ganglion; division of inferior dental, by incision made inside mouth; intra-cranial neurectomy, the second and third divisions of fifth being divided outside the dura mater, after trephining in left temporal region, etc.

Dr. Clark reports a case, where there was severe neuralgia of first and second division of fifth nerve, on left side, in which teeth had been extracted vainly, and no relief was obtained except by morphia. Dr. Clark operated, locating the infra-orbital and supra-orbital foramina, and dividing the nerves. Then the small round tip of a Paquelin's cautery was pushed, upward and backward, through the infra-orbital foramen, half-an-inch into the canal, destroying the nerve. Since the operation (a year ago), the patient has been perfectly free from pain.

TERRIER and HARTMANN. "Myoma of the bladder."—*Journal des Praticiens*, April 20, 1895.

THE authors have just published in the March number of the *Revue de Chirurgie* a report of a special study on this variety of bladder tumour.

These vesical myomata are rather rare, only about 16 cases being known, but they have been found in both sexes and at the two extremes of age.

They are very analogous in their character and structure to uterine fibromyomata. They spring from the thickness of the muscular wall of the bladder, and extend either on the outside or inside of that organ, hence the division into "myomes excentriques" and "myomes cavitaires" (Albarran). The latter are the more frequent. They may be sessile or pediculated, and their size may vary from that of a nut to that of an adult's head, and even larger. They are usually very limited, encapsuled, and easily enucleated.

In the case of a "myome excentrique," there are scarcely any vesical symptoms; the myoma only betrays its presence by the slow growth of a tumour, which hinders the function of neighbouring organs.

In the case of a "myome cavitare," the ordinary symptoms of vesical neoplasms are observed: frequent hæmaturia, painful micturition, sense of weight in the perineum or hypogastrium.

By rectal or vaginal examination, especially when combined with abdominal palpation, the presence and nature of these tumours may often be made out.

The progress of these myomata is variable; death is oftenest the result of secondary accidents of infection.

In the case of excentric myomata, the treatment is obvious, enucleation of the growth through an abdominal incision, with suture of the incomplete wound of the coats of the bladder.

In myomata projecting into the cavity of the bladder, after the supra-pubic cystotomy, small-sized tumours are drawn out by forceps and excised, the vessels being then ligatured and the mucous membrane sutured. If the tumour is bulky it is more simple to divide it through the middle, shelling it out gradually until the peripheral parts are removed. After removal of the tumour, drainage of the bladder is assured by syphon tubes in the male, or an abdomino-urethral drainage tube in the female

Francis J. H. Coultts.

RICHET and HÉRICOURT. "De la sérothérapie dans le cancer."—*Gazette médicale de Paris*, May 11, 1895.

"La guérison du cancer par le sérum antiférysipélateux."—*L'Union Médicale*, May 11, 1895.

MM. RICHET AND HÉRICOURT report two cases of malignant disease which were treated by inoculation of the blood serum of animals (an ass and two dogs), into which had been injected some days before the filtered and diluted juice of an osteo-sarcoma removed from the leg. The first case was a recurrent fibro-sarcoma; 120cc. of the serum were injected into the cellular tissue round the growth, in doses of 3cc. at intervals of four hours. The growth began to diminish in 15 days, and its site is now occupied by an indurative "plaque" less than one-third the size of the original growth. During the treatment the patient's general condition improved, and she put on weight.

In the other case a man of 44, with cancer of the stomach, 64cc. of the serum were injected. The patient gained 6½ lbs. weight during the fortnight after the inoculation began, and the isolated tumour which could be previously felt disappeared, leaving only an indistinct feeling of resistance in the epigastrium.

As regards the treatment of malignant disease by the toxins of erysipelas cocci, Emmerich and Scholl have employed the filtered and sterilised blood serum of sheep which have been inoculated with a pure culture of the micrococci of erysipelas. From 4 to 20cc. of this serum are injected into the growth. The larger doses are followed by pain, lasting some hours. Considerable local reaction marked by redness and swelling is set up around the seat of injection, and this lasts from 24 to 48 hours. There is also occasional rise of temperature, but this is not sufficient to cause headache or loss of appetite. In two cases of

recurrent carcinoma the treatment had no effect. In seven cases of sarcoma, diminution in the size of the growth followed on the inoculations, but no case of cure seems to be recorded.

At the recent Surgical Congress in Berlin, in a discussion on this subject, Friedrich, of Leipzig, obtained no effect in 14 cases of carcinoma, whilst among sarcomata one case only appeared to benefit from the treatment, the tumour, a lympho-sarcoma of the neck, remaining stationary, the patient's general condition being sensibly ameliorated. Lauenstein, of Hamburg, tried the treatment in a case of cancer of the uterus, but without success. In a case of cancer of the pelvis, under the care of Professor Kocher, the growth appeared to diminish for a time, but soon grew rapidly again.

J. W. Smith.

Midwifery and Diseases of Women.

UNDER THE CHARGE OF W. J. SINCLAIR, M.A., M.D.

DÜRSSEN. "Incisions of the cervix and perineum during labour."—
Archiv für Gynäk., XLIV., 3, 1894.

THIS is an account of all the cases under the author's care or observation in which incisions were made into the cervix uteri, or through the margin of the vulva, in order to assist the process of parturition. The subject of incision of the perineum is of comparatively little interest. Deep incisions through the cervix uteri is, however, one of very considerable interest and importance. According to the author, the method of treatment is unaccompanied by danger in all cases in which the patient has not been infected. It is taken for granted that the remark applies to cases in the hands of men of experience, and when full attention is paid to the rules of antiseptics. Incisions of the cervix may prevent the need for perforation of the living child, and may generally avoid proceedings dangerous to the mother or the child, in order to overcome dystocia, depending upon incomplete dilatation of the cervix. Twenty-seven cases are mentioned in which perforation of the foetal head was avoided by means of incisions of the cervix. In 24 of these cases labour was completed by the use of the forceps, and in the others version and extraction were resorted to. The mortality amounted to one mother and one child. Dürssen recommends the vagino-perineal incisions in order to make powerful use of the forceps unnecessary, and so to diminish the infantile mortality, and the injuries to the mother which so often

result from forcible traction. The necessity for deep cervical, and for vagino-perineal, incisions usually arises in cases of elderly primiparæ. Before making incisions, it is of course necessary to ascertain by careful examination that the dystocia does not arise from pelvic deformity, or from extreme abnormality of the fœtus.

As to operative details, it is recommended that four incisions should always be made, going as deep as the vagina, the first behind, the two following at the sides, and the last in front. Suture of the incisions in the cervix immediately after labour is unnecessary. With regard to the vagino-perineal incisions, it is asserted that one deep lateral incision is preferable to two comparatively shallow ones. This incision is made very deep once for all, and sutures are introduced immediately after parturition.

After several years of experience of this operation, the author has not seen any bad effects, such as prolapse of the uterus or vagina, and subsequent labours appear to be rendered more easy.

DOLÉRIS. "Abortion hastened in a case of serious hæmorrhage due to separation of the placenta in the course of prolonged parturition; incisions into the cervix uteri."—*Nouvelles Archives d'Obstetrique et de Gyneæ*, February, 1895.

THE case recorded is an example, which the author calls exceptional, of the possibility of serious and repeated hæmorrhages, to the extent of threatening life, in the course of a tedious abortion.

The anatomical condition is described as similar to a case of placenta prævia. The separation of the placenta goes on slowly, step by step, without any modification in the condition of the uterus itself. There is no uterine contraction and no change in the cervix. The ovum remains intact, and the hæmorrhage goes on from day to day, varying in amount until the patient becomes extremely anæmic. Syncope recurs frequently, and there is a general depression, threatening to lead rapidly to a fatal termination. In such a case as this, in a patient who began to have attacks of hæmorrhage in the second month of pregnancy, emptying of the uterus was finally effected by means of dilatation and incisions of the cervix. After bleeding continued daily from the beginning of October to the middle of December, she was admitted to the hospital. At that time she had slight pains. It was also ascertained that she had previously had three abortions, accompanied by severe hæmorrhage. An exact description is given of the patient's condition on admission to the hospital, and a note appended to the effect that on the following days the same signs were observed, including continuous.

hæmorrhage, although in smaller amount, and there was an entire absence of uterine contractions. The patient's general condition is indicated by the fact that her face was pale, her lips white, and the pulse of feeble tension and rapid. The condition of the patient became worse from day to day, and on the 1st of January, without the hæmorrhage having become more abundant, she lost consciousness several times. Hypodermic injections of ether were given, and a tampon was introduced into the vagina. On the 2nd of January—that is to say, a fortnight after the patient's admission—the treatment of the case began. There is nothing special in the efforts made to dilate the cervix, except that in the attempt to dilate with Barnes's apparatus the first *ballon* burst under the *pressure of the air*. Owing to the difficulty in effecting sufficient dilatation, and owing to the hæmorrhage producing extremely grave symptoms, the operator made deep lateral incisions through the cervix. The ovum, with some old blood clot, was then extracted by means of a pair of ovum forceps, and the curette was used only to complete the proceedings. The wounds in the cervix were brought together by two catgut sutures on each side.

Details are given of the after-treatment and the condition of the patient. A suggestive note of January 5 shows that the patient's temperature varied from 103° to 104°, and the pulse from 130 to 158. Marked phenomena of depression and stupor. There was abundant diarrhœa during the following night, and to the previous treatment were added inhalations of oxygen and injections of serum, and later, the application of ice in order to diminish the pain. The patient ultimately recovered, and it was found later, on vaginal examination, that the wounds had remained partially ununited, and an *eschare* was found on the margin, bearing witness to an infected spot.

In the notes no reason is assigned for the delay of a fortnight in emptying the uterus, and putting an end to an hæmorrhage which, at the time of the patient's admission to the hospital, had been going on for over two months.

FRITSCH. "Occlusion of the uterus after curetting."—*Centralb. für Gynäk.*, December, 1894.

THIS is a case which came under Fritsch's observation at Bonn. A woman, who had been confined in January, 1892, had some post partum hæmorrhage, and a specialist, in whose care she was, employed the curette. From that time she had no uterine discharge, either red or white. It was found, on examination, that the cervix was firm and small, the external os closed, and the uterus, on bimanual examination, appeared to be small or even infantile, but it was impossible to

measure it on account of the absence of a canal. The ovaries could be made out to be movable, and apparently normal. The canal of the cervix could not be found until an incision had been made through the orifice, and then a probe could be passed for about two-thirds of an inch, but no kind of instrument could be made to pass any further. With considerable perseverance in the use of a scalpel and a dilator, it was possible, ultimately, to pass a sound so as to feel this point under the abdominal wall. No attempt was made to proceed further for fear of perforating the fundus uteri. The canal, as produced, was thoroughly dilated by means of tents and tampons; but a fortnight after, active treatment was given up, as it was impossible to find any trace of the artificial cavity.

Fritsch calls attention to this remarkable result of the energetic use of the curette during the puerperal period on a uterus undergoing involution. Although the ovaries appeared to be perfectly normal, there was an entire absence of any menstrual molimen; there was, in fact, no discomfort at any time to call the periods to mind. Owing to the occlusion of the uterus the patient was in the condition of a woman who had passed the menopause.

Pharmacology and Therapeutics.

UNDER THE CHARGE OF D. J. LEECH, M.D., D.Sc., F.R.C.P.

BARDET. "Etude sur les propriétés thérapeutiques et désinfectantes de la formaldehyde ou formol."—*Bull. gén. de Thérapeutique*, April, 1895.

FORMALDEHYDE, formaline or formol, represented by the formula CH_2O , was discovered by Hoffmann, and hitherto has only been obtained in mixture with methyl alcohol. It is prepared by passing a mixture of air and the vapour of methyl alcohol into a large tube containing very fine platinum threads heated to a rather high temperature. The liquid which condenses is formic aldehyde dissolved in methyl alcohol. The aqueous or alcoholic solution of formol is colourless, strongly irritating to the mucous membrane, and possesses the characteristic odour of mice. The commercial solution of formol in methyl alcohol cannot be obtained stronger than 50 in 100.

Formaldehyde has the property of hardening nitrogenous substances of the nature of gelatine and fixing them. Gelatinous substances so

fixed become insoluble in water, even boiling water. This property may explain the surprising antiseptic action of formaldehyde, which may in the same way *fix* the chitinous capsule of the bacteria and their spores, thus rendering them incapable of vital changes.

In 1888 Trillat noticed that urine became imputrescible on the addition of formaldehyde. By more recent experiments he has demonstrated that its antiseptic power is superior to that of perchloride of mercury. In experiments with bouillon, formaldehyde, in the proportion of 1 in 30,000, sensibly retards fermentation, and in that of 1 in 25,000 the bouillon was unaltered at the end of four days.

With a similar proportion of perchloride of mercury decomposition showed itself at the end of 24 hours, and with a strength of 1 in 6,000 in five or six days. On the other hand, a strength of 1 in 12,000 of formaldehyde preserved bouillon intact for several weeks.

The results obtained by submitting animals to subcutaneous or intravenous injections are not of a nature to encourage us to adopt this substance as a general antiseptic.

Berlioz and Trillat have studied the action of the vapour of formaldehyde, and find it is rapidly diffused in animal tissues, and renders them imputrescible, the animal tissues absorbing the aldehyde. They also find the vapours, even when very dilute, prevent the development of micro-organisms. The vapours sterilise in a few minutes substances impregnated with Eberth's bacillus or with anthrax. The vapours are toxic only when breathed for several hours, and in large quantity.

Other experimenters have confirmed the sterilising powers of formaldehyde, and Duclaus has used it clinically as an antiseptic in his practice as ophthalmic surgeon.

De Buck and Vanderlinden found on subcutaneous injection that the toxic dose for the rabbit was about four to six decigrammes of formaldehyde. They come to the conclusion that:—(1) Formol in aqueous solution, 10 in 100, fulfils well certain desiderata in modern surgery, as an aseptic and antiseptic liquid. (2) At this strength formol can only exert a very slight injurious action on the tissues. (3) Its absorption is not to be dreaded, as the toxicity is feeble.

Schmidt has noted the deodorising effect of formaldehyde on putrefying foods, on urine, and on faecal matters.

Holfert has called attention to the use of this substance to preserve vegetable products; it does not alter chlorophyll and vegetable pigments.

Schmitt has confirmed the antiseptic properties of formol, finding that bouillon inoculated with staphylococcus pyogenes aureus, etc., does not become cloudy if it contains formaldehyde in the proportion of 1 in 20,000, but he warns medical men against the deductions they might be

liable to draw as regards its application to antiseptic surgery and obstetrics. In three series of experiments he has observed that an hour's contact with a solution of 1 in 1,000 does not prevent the development of micro-organisms.

Even with a solution of 1 in 100, five minutes' exposure did not succeed in killing these bacteria. In this strength formol is out of the question for rendering wounds and mucous surfaces antiseptic, owing to its irritant and caustic action. Carlo Ascoli also says that solutions of formol present no advantage over the disinfectant liquids employed in surgery, for they tend to cause necrosis and mummification of the skin. Formol may be used for the disinfection of putrid matters, being a deodorant as well as antiseptic. The vapours are useful for the disinfection of clothes and books, which would be destroyed by other substances.

Berlioz has tried experiments on animals and men with a view to applying this aldehyde in the treatment of tuberculosis and diphtheria. His experiments on animals have been disappointing and those on men have not been more successful. Intramuscular injections of an emulsion of formol in oil or vaseline were very painful and often produced abscesses. Pills of triformol or trioxymethylene were badly borne, interfering with the appetite and sometimes causing sickness. However, inhalations of air bubbled through a solution of formol have proved efficacious in phthisis, diminishing the quantity and the purulence of the sputum. The inhalations are very active in coryza, in cases of acute tracheo-bronchitis. The nasal secretion is rapidly dried up; the cough and the expectoration cease in a few hours. But it was in hoarseness that Berlioz observed the best results. Under the influence of inhalation for five minutes, the voice regained its clearness.

Miquel has lately, in a long and laborious piece of work, gone over the ground again, and shown that formol vapour has an extremely energetic action on germs.

Dr. Bardet sums up his review of the question thus:—(1) Formol is an excellent germicide, and it acts best in the state of vapour; (2) Formol has been badly studied yet from the point of view of its application to medicine. This is due to the fact that, owing to its marked odour and its irritant action on wounds and mucous membranes, medical men have abandoned it in favour of less irritating antiseptics.

MOLLIÈRE. "New researches on the external application of pillocarpine in the treatment of nephritis."—*Lyon Médical*, April 14 and 21, 1895.

THIS is a long and interesting article, reporting the results of patient researches that Dr. Mollière has carried on for some years.

Since the introduction of pilocarpine into therapeutics, in 1879, Dr. Mollière, along with others, has used the drug hypodermically in cases of nephritis.

Uræmic attacks were frequently warded off or cured by the use of this medicament, in cases in which a condition of anæmia contra-indicated bleeding. But though pilocarpine proved so successful in many cases, especially in young people, and in those whose circulatory system was not affected, it often gave rise in old or middle aged subjects to symptoms of collapse, and needed to be very carefully watched. One had to take into account the troublesome action on the heart, which in these kidney diseases is often secondarily affected.

Led by the experience of his brother in the treatment of joint affections by the external application of jaborandi, Dr. Mollière began to employ the same method of treatment in several affections, and particularly in nephritis, with most satisfactory results. He has used it for ten years, and found it of great value both in acute and chronic nephritis, producing rapid cure in the first, and an improvement in the second case, with a much longer survival than by the use of other palliative methods. The treatment consists of friction applied to the trunk with an ointment thus composed: White vaseline, 100 grams; nitrate of pilocarpine, from 5 to 10 centigrams at most, for a larger dose of pilocarpine gives rise to very disagreeable skin eruptions. Then the region treated is covered with a thick layer of cotton wool and a sheet of oil-cloth, the whole being kept in place by bandages.

At first Dr. Mollière used to take off the apparatus at the end of an hour or two. Now he leaves it on, unless the patient gets too damp with perspiration. Sometimes improvement is seen in two or three days, sometimes it is 10 or 15 days before the œdema disappears along with the other serious symptoms characteristic of nephritis, and it is important to carry out the treatment regularly for weeks or months if necessary.

Under the influence of the drug a series of phenomena are observed, which may occur simultaneously, but which the author discusses separately for the sake of precision:—

(1) Whether on a rigid milk diet or not, from the first application the patients acknowledge a feeling of well-being and marked relief; dyspnoea disappears, and respiration is more regular.

(2) There is a very abundant perspiration, which sometimes causes the layers of cotton wool to be completely moistened. The sweat is at first viscous, then aqueous, with different reactions from the normal. At the commencement of the cutaneous applications the sweat is perfectly neutral. Gradually, at the end of some hours, it becomes acid, but never as much so as normal sweat. In patients who have had injections of pilocarpine, perspiration is abundant, but coincidentally the

urine diminishes in amount. The perspiration due to the "packing" with pilocarpine, on the contrary, is accompanied by a *diuresis*, and there is no salivation, a phenomenon which always occurs after injections. In some cases good effects have followed the external use of pilocarpine, although sweating never occurred.

(3) At the same time as the diaphoresis, a very abundant diuresis is produced, which may be considered the most beneficial phenomenon of all. The amount of urine may rise to two or three litres in the twenty-four hours, or in acute nephritis even higher figures may be noted.

Dr. Mollière gives charts showing by means of curves the daily variations in the amount of urine secreted. He finds the results similar whether the patient is on a milk diet alone or on a mixed diet. Occasionally apparently contradictory phenomena are observed. Under the influence of pilocarpine packs, patients with nephritis and polyuria see their urine *diminish* in amount, whilst those with anuria find this excretion return to a normal quantity. Even in anuria of reflex origin, where the kidneys were not diseased, pilocarpine relieved the condition.

Dr. Mollière points out how diarrhoea, the increase or diminution of the fluids ingested, and the amount of perspiration, exercise a disturbing influence on the quantity of urine excreted in a given time in patients using the pilocarpine. This explains why certain experimenters have found that pilocarpine has no diuretic effect.

(4) In acute nephritis the albumen disappears very rapidly under the influence of pilocarpine packs. The cure is complete, as many observations show conclusively. Of course it is not the same in the chronic forms, where kidney lesions exist, which are almost always irremediable. However, at the end of some weeks of treatment, the albumen markedly diminishes, and the oedema disappears, whilst the general state improves.

(5) Dr. Mollière has not made special researches into the variation of urea, which he thinks of little value, particularly as Leube has shown that in forced perspiration large amounts of urea were eliminated in the sweat and less in the urine.

Dr. Mollière has treated at least 50 cases by his method, the best results being, of course, obtained in cases of acute or sub-acute nephritis, even though some of these cases have been exceedingly alarming. Usually he did not confine his patients entirely to milk, he allowed broth or soup, with herbs; later, white meat, veal or chicken. The only contra-indication to the treatment is uræmia, which demands more energetic treatment. When bleeding, chloral, cold applications, etc., have made the danger disappear, the friction with pilocarpine may be ordered.

Dr. Mollière finds the treatment perfectly harmless, even in, very high degrees of sclerosis of the kidneys. In patients with cardiovascular sclerosis and chronic nephritis the treatment does not give very satisfactory results, especially when the heart muscle is profoundly affected.

Dr. Mollière considers that the action of pilocarpine when externally applied is quite local, as it does not produce salivation and is not excreted in the urine, proving it is not absorbed into the system. He thinks a clue to its diuretic action may be found in the work of Guinard and Geley on the cutaneous application of certain alkaloids.* As sparteine may, by acting centripetally, cause lowering of temperature, so pilocarpine, by contact with the skin, may give rise to a medullary reflex leading to dilatation of the vessels of the kidney.

Francis J. H. Coultas.

Diseases of Children.

UNDER THE CHARGE OF HENRY ASHBY, M.D., F.R.C.P.

THE ALBUMINURIA OF DIPHTHERIA.

BAGINSKY (A.). "Die klinische Erscheinungen der diphtherischen Nierenkrankung."—*Archiv f. Kindk.*, Band XVI., p. 331.

BERNHARD (L.) und FELSETHAL (S.). "Beitrag zur pathologischen Anatomie der Diphtherieniere."—*Archiv f. Kindk.*, Band XVI., p. 308.

GOODALL (E. M.). "Suppression of urine in diphtheria."—*Lancet*, February 2, 1895.

WILDE (LEONARD). "Suppression of urine in diphtheria."—*British Medical Journal*, May 11, 1895.

SINCE Dr. Wade, in 1857, first called attention to the presence of albumen in the urine of patients suffering from diphtheria, a goodly number of writers have called attention to the subject, and discussed the nature of the albuminuria and its diagnostic importance. Dr. Wade also pointed out that in some few cases the symptoms of uræmia were also present, and this was also described by some French writers, as Germain See and Bouchut, who had noticed the presence of albumen in the urine in diphtheria, independently of the observations of Dr. Wade.

* MEDICAL CHRONICLE, October, 1894, p. 42.

Some of the most interesting and exhaustive observations on this subject have recently been made by Baginsky and his assistants at the Children's Hospital in Berlin, where there is an isolation pavilion for diphtheria, and where a large number of cases are treated annually.

The urine was systematically examined in 279 cases of diphtheria for albumen, and microscopical examinations were made of the urinary sediment. In all the cases Loeffler's bacillus was detected in the secretions, so that it may be taken for granted that no cases of non-diphtheritic sore throats were included in the list.

Of the 279 cases albumen was found in the urine in 131, that is, in rather less than half of the cases; of these 66 died, or 50 per cent. Of the 148 in which albumen was absent 20 died, or 14 per cent.

Of the 279 cases tracheotomy or intubation was performed for the relief of the laryngeal stenosis in 91 cases. Of these, 61 had albuminuria, with 42 deaths, that is, 69 per cent. Of the 30 tracheotomy cases in which no albumen was found, 19 died, making a mortality of 63 per cent.

From these figures we gather that the prognosis in a case of diphtheria in which the larynx remains free, and in which no albumen appears in the urine, is much better than in those cases in which albumen occurs, as the mortality was 14 per cent in the former and 50 per cent in the latter. The mortality is about the same in laryngeal diphtheria, whether albumen occurs or not.

Baginsky divides his cases into three groups according to the severity of the symptoms.

(1) *Mild Diphtheria*.—In these cases there is no albumen, or it is small in quantity and quickly disappears as the patient improves. In these cases the amount of urine secreted is normal, or is only slightly diminished in quantity. There is no œdema. The author emphasises the fact that even in the mildest cases of diphtheria, and where albumen is absent, renal epithelium, leucocytes, and hyaline cylinders are found in the sediment on microscopical examination. The epithelial cells are swollen and granular, and the nuclei seen with difficulty. It would appear that even in the mildest cases of diphtheria the toxins present in the blood give rise to changes in the epithelium lining the renal tubes.

(2) *Malignant Diphtheria*.—In these cases the local affection is severe, consisting of an inflammation of the septic type. There is gangrene of the pharynx and tonsils, much glandular enlargement and cellulitis, various hæmorrhages, and heart failure. There is often vomiting, especially when the urine is small in quantity. The urine is usually notably diminished in quantity, and there is a large amount of albumen. A microscopical examination of the urinary sediment shows much epithelial debris, the epithelial cells being swollen and granular.

There are often hyaline cylinders with epithelial cells attached. Blood cylinders are occasionally present. Suppression of urine is rare, as also are uræmic convulsions, the patient dying before these have time to develop.

(3) *Subacute Diphtheria*.—In some attacks of the less virulent type there is well-marked heart depression, paresis of various muscles, and a large quantity of albumen in the urine. In these cases there is often vomiting, diminution of urine, and, in quite exceptional cases, uræmia.

Bernhard and Felsenthal made a careful study of the morbid anatomy of the kidneys in the fatal cases of diphtheria in cases belonging to the same series as those observed by Baginsky. The naked eye appearances did not show any great departure from the normal, in other cases the kidneys were swollen and hyperæmic. The cortex was mostly pale, the medullary portion red and filled with blood. The capsules stripped readily, and there were often minute hæmorrhages to be seen on the stripped surface. On microscopical examination the principal changes were connected with the epithelial cells. These were swollen and granular, and readily broke up into detritus. The nuclei were large and difficult to stain. A few fibrin cylinders, and some containing blood corpuscles were found. Among the minor and less constant changes were a glomerular nephritis and some infiltration of leucocytes into the interstitial tissues. The authors take the view that the changes were due to an "acute toxic nephritis."

These observations are practically in agreement with the experimental researches of Spronck. This experimenter injected pure cultures of Loeffler's bacillus subcutaneously into dogs and guinea-pigs. An examination of the kidneys in the fatal cases showed the kidneys to be swollen and congested, the cortical portion being enlarged and pale, with numerous punctiform hæmorrhages. The microscopical examination showed a fatty degeneration of the epithelium of the cortical substance.

Dr. Goodall relates the histories of six cases of diphtheria in which partial or total suppression of urine took place, five out of the six cases terminating fatally. They were all severe cases with much local affection, there was albuminuria, frequent vomiting, and marked cardiac failure before the anuria set in. In one case there was anuria for 70 hours before death. He gives an analysis of 30 cases of diphtheria in which anuria was present in a marked degree. In seven of these 30 cases there was total suppression of urine for 18 to 70 hours before death. The suppression may set in either gradually or suddenly, the urine is normal in appearance, and there is rarely any sediment as in scarlet fever nephritis. Vomiting is mostly present. Symptoms of cardiac failure are also present, the pulse is soft and small and the

cardiac sounds faint. The kidneys are mostly normal to the naked eye, though in some cases the cortex is paler than normal and somewhat increased in size. The author examined ten cases microscopically, and reports the kidneys normal in some cases, in others there was a slight infiltration of leucocytes in the interstitial tissues. Dr. Goodall believes there is no true nephritis in these cases, but that the anuria is due to nerve influences.

Dr. Wilde records three cases which were fatal, in which anuria occurred 30 to 36 hours before death. In all three cases the local symptoms were severe, pharyngeal and nasal exudation were present; there was marked pallor, debility, and signs of cardiac failure. There was a large amount of albumen in the urine, and a diminished quantity prior to the suppression coming on. There was a fall in the temperature, and vomiting and diarrhoea. The knee reflexes disappeared during the course of the attack. The author believes that the cause of the anuria is a peripheral neuritis of the abdominal sympathetic, and suggests that this gives rise to a lowering of the blood pressure in the kidneys. The frequent association of intractable and copious vomiting and diarrhoea suggests profound interference with the functions of the abdominal sympathetic system.

The frequency with which albumen occurs in the urine in diphtheria is differently stated by various observers. Thus, in 91 cases observed by Dr. J. Abercrombie, albumen occurred in the urine of 24 cases, that is, in only about one-fourth. In Baginsky's cases, as recorded above, albumen was present in one-half; Oertel found albumen in two-thirds of his cases, and some other observers have discovered even a larger percentage still. It is possible that the frequency with which albumen occurs may differ in different epidemics; or that one observer may happen to treat a series of very severe cases of diphtheria, and another may see a large proportion of mild cases. My own experience of diphtheria is that albumen occurs in the urine in by far the majority of cases which are severe enough to be admitted into hospital, and in which the local affection involves the fauces. I have found it also in traces in the urine of mild cases, though it may not be present for the first few days. It is less common in the urine of those cases where the false membrane affects the larynx only, and in "wound diphtheria," where there is no faucial affection, it is mostly absent, and indeed in these cases there is little constitutional disturbance. It would seem as if the presence and amount of albumen was an index of the extent of ptomaine poisoning in progress, and in this connection it is interesting to note Baginsky's observation that in mild cases of diphtheria, in which no albumen is present, swollen epithelial cells and a few hyaline cylinders may be found in the urinary sediment.

There can be little doubt that daily testing of the urine in diphtheria may give us valuable information concerning the progress of the case. An increasing quantity is unquestionably a bad sign, as indicating an increasing amount of "albumose" poisoning, while if the albumen is clearing up, it would look as if the case were progressing favourably. A large quantity of albumen, such as a third or a half volume, on standing after boiling is of very grave significance, though I have seen several cases end in recovery, notwithstanding that there has been as much as a half volume of albumen in the urine on boiling.

The cases of anuria occurring in the course of diphtheria recorded by Goodall and Wilde are interesting as illustrating an occasional complication of diphtheria and an exceedingly formidable one. In certain cases of diphtheria, mostly of the severe, if not malignant, type, where there is scanty urine and much albumen, the secretion may entirely cease, and there may be complete anuria for many hours before death. In other cases only a few ounces may be passed per diem for some days before death. Suppression of urine is usually heralded by a fall in temperature to perhaps below normal and vomiting; less often there is diarrhoea. At times there are muscular twitchings, convulsions, and rarely oedema. Recovery must be extremely rare after suppression has once set in; Goodall records such a case, and I have also seen one.

What is the nature of the albuminuria of diphtheria and the occasional suppression of urine? The observations of Bernhard and Felsenthal, already quoted, as well as those of other observers, plainly point to a "toxic nephritis." The word nephritis has been used, but it is hardly appropriate, for there is no inflammation in the true sense; it would appear to be more of a degeneration. There can be no doubt it differs from the nephritis seen after scarlatina, where there is an inflammation of the croupous type, accompanied in typical cases with fever, and in which much fibrin and blood passes into the tubuli of the kidney. In diphtheria the albumoses present in the blood appear to act as virulent poisons on the terminations of nerves, on the epithelium of the kidneys, as well as on the blood corpuscles and involuntary muscular fibre. Damage to the renal epithelium gives rise to the passage of albumen from the blood into the urine, inasmuch as the special office of the epithelium is to select certain substances from the blood, such as urea, and to prevent the passage of the other constituents, such as albumen.

It is difficult to account for the suppression of urine in some of these cases. In scarlatinal nephritis, when the tubes are blocked with fibrin casts, and consequently the tension in the tubules is increased, urine ceases to be secreted, just as when the ureter is ligatured experimentally. But in the kidneys of diphtheria this does not occur. Microscopical examination in these cases shows there is no blockage of the tubules,

and, excepting changes in the epithelium, very little that is abnormal can be seen. Dr. Wilde suggests a peripheral neuritis may account for it, by dilating the arteries of the abdominal viscera and thus lowering the pressure on the renal arteries. It appears to me that there may be two causes at work, viz.: (1) A profound poisoning of the epithelium, and in consequence an interference with the activity of the cells; (2) a general fall in the blood pressure in consequence of an extremely feeble action of the heart.

Henry Ashby.

Diseases of the Eye.

UNDER THE CHARGE OF CHARLES E. GLASCOTT, M.D.

POSSANER (BARON G.). "The duration of life after the appearance of retinal trouble in Bright's disease."—*Deutschmann's Beiträge*, Fascic. XV., p. 22.

OUR author reports 131 cases, chiefly occurring in the practice of Professor Haab, and at the Eye Clinic of Zurich during periods respectively of 30 and 16 years.

All cases of albuminuria of pregnancy, and cases where the fundus changes were not absolutely typical are excluded. His statistics appear to show that not more than seventeen per cent of cases of Bright's disease ever present eye symptoms, the relative frequency of albuminuric retinitis to all other classes of eye disease being only two per thousand.

On examining the literature of the subject he found a general consensus of opinion that albuminuric retinitis was very grave in its consequences, not only as to vision, but as menacing the patient's life, two years being put down as the limit of existence after the retinal symptoms had declared themselves. It may be noted in this connection that most authorities connect retinal disease with granular kidney, but that Leber and some American writers admit that it may occur in the the case of large white kidney.

Possaner's researches lead him to classify the gravity of kidney lesions according to sex, and according to condition of life, the latter implying a great difference in hygienic surroundings.

For instance, of the hospital cases drawn from the poorer classes and persons unable to use the necessary hygienic precautions, we find that 72 per cent die in twelve months, and of the survivors 9·2 per cent died before the expiry of two years, making a mean of 81·2 per cent of deaths in two years.

Male hospital cases died off at the rate of 100 per cent in two years, while female hospital patients show a mortality of 68·4 per cent in the same time. The longest survival noted was in the case of a female, who lived six years.

To contrast this with cases in private practice, whose conditions of life were presumably better than those quoted above, we have the following figures: Mortality amongst males in a period of two years from the onset of the retinal symptoms was 61·5 per cent, amongst females it was 53·8 per cent; here also there were exceptional cases of survivorship for four, six, seven, and even eleven years (in one case), mostly amongst females. Thus the prognosis is worse for males than females, probably owing to the greater use of spirituous drinks, and greater exposure to the changes of the weather, and for persons belonging to the poorer classes than to those more able to surround themselves with little comforts. The age of the patients when attacked, which varied from 30 to 60, does not seem to have any notable effect upon the progress of the renal disease.

DUJARDIN (M.) "Delirium and death after cataract extraction."—*Recueil d'Ophthalmol.*, No. 2, 1895.

THE case reported is one of a man, aged 57, operated on for cataract. The same night he was seized with delirium, which passed off during the day, but continued to recur at night, each succeeding attack being increasingly violent, the patient's previous history pointing to the fact that the case was really one of delirium tremens occurring in an alcoholic person. The attacks of delirium lasted for four days, when death supervened. The case is worth putting on record, as such cases occur occasionally after cataract extraction, Messrs. Parinaud and Valude having some time ago collected a series of them. Certainly an unusual termination such as this can only be referred to an accidental cause, such as delirium tremens after injury, or to atheroma of the cerebral vessels. No doubt, again, moral impressions, such as alarm in excitable subjects, may have a great weight in producing delirium, especially as has been noticed when both eyes are excluded from the light by a protective bandage, it having been observed over and over again in slight cases of delirium after eye operations in old people, that the patients at once seemed to calm down when the bandages were removed.

GOLDZIEHER. "Treatment of keratitis."—*Recueil d'Ophthalmol.*, No. 2, 1895.

IN a short note Dr. Goldzieher recommends a cleanly and efficacious treatment for those cases of ulcer of the cornea which are not sufficiently

grave from their size or depth to require operative interference; he also recommends his ointment in slow painless diseases of the cornea, such as diffuse keratitis and keratitis punctata when of a superficial character. The ointment, which is placed between the lids, being used very much as we are in the habit of using the well-known ungt. hyd. oxid. flav., is composed of sozoiodolate of soda and vaseline, to which can be added either atropin or eserine, as the case requires.

The author's formula is:—

Sozoiodolate of soda.....	25 cgm.
Atropin sulphate	5 cgm.
Vaseline.....	10 grammes.
	M. ft. ungt.

LENOBLE (M.). "Nystagmus produced by etherisation."—*Recueil d'Ophthalmol.*, No. 2, 1895.

It is worth mentioning the following observations made by M. Lenoble, and communicated by him to the Société de Biologie, by way of attracting the attention of anæsthetists to the condition of the eye muscles after etherisation. In 42 cases of operation, where ether was the anæsthetic used, he noticed the occurrence of nystagmus and transient epileptoid symptoms in 29, the nystagmus being in every case transversal and bilateral. The epileptoid tremors were observed in one half of the cases, and were confined to the lower limbs, except in one case, where the arms were also affected: in a few rare cases the tremors only affected the feet, and in others were unilateral. Neither the position of the patient nor the nature of the operation seemed to influence their production in the least. He also noted that patellar reflexes are unaffected by etherisation. We are not aware whether phenomena such as described have been noticed in this country during or after etherisation.

BUDIN (M.). "Preventative treatment of ophthalmia neonatorum."—*Recueil d'Ophthalmol.*, No. 2, 1895.

At the risk of being tedious, the importance of M. Budin's evidence as to what can be done by the prophylactic treatment of the eyes of newborn infants, is such as to demand notice in these columns. For the last three years he has been in the habit of using a solution of 1 in 150 of nitrate of silver as a preventative of ophthalmia. In a series of two thousand and four confinements in hospital, he only had two cases of true ophthalmia neonatorum, and seven cases of secondary conjunctivitis, this being the term used for cases of purulent disease coming on after the first week of life. In private practice he follows the same

method of prophylaxis, and has never met with a case of purulent discharge from the eyes. His procedure is as follows:—As soon as ever the child is born, and while still between the limbs of its mother, its lids are separated, and two or three drops of the solution instilled into the eyes, the surplus being wiped away with a little cotton wool. This simple manœuvre, which should be an essential part of the routine attention to the new-born child, has been the means of saving many a child from a disgusting and tedious malady, which so often terminates in lifelong interference with normal vision, and not unfrequently in total blindness.

C. E. Glascock.

Diseases of the Ear.

UNDER THE CHARGE OF W. MILLIGAN, M.D.

VAN DYCK (W. T.). "Hysterical (or functional) deafness."—*Brit. Med. Journal*, May 4, 1895.

IN this case the patient, a boy aged 19, had been noticed to have been becoming somewhat dull of hearing for a few days. In addition he was unusually silent. The degree of deafness and of speechlessness had been variable, but had increased until, when seen by the author, he was unable to utter a sound or give evidence of hearing anything. Examination showed the meatus and the membrane to be perfectly healthy, and there was no evidence of paralysis, inco-ordination, cutaneous anaesthesia, or abnormality of reflexes.

Various loud sounds were made close to the patient, but he failed to hear any of them. When asked to walk across the room (the request being written down) he did so, and, to the author's surprise, when told to turn round and come back, did so also. Iodide of potassium was ordered more as a placebo than as anything else. The next day he was speaking and hearing as well as ever. He then said that upon a previous occasion he had had a similar attack. The diagnosis of functional deaf-mutism was made, and ammonium bromide with ammoniated tincture of valerian, ordered with, in addition, a blister to the nape of the neck.

WALKER SECKER. "A case of double mastoid disease with septic thrombosis of the lateral sinus."—*British Medical Journal*, April 13, 1895.

THE patient, a female aged 24, had had intermittent discharge from both ears for 4—5 years. Four weeks before her admission to hospital

a swelling had appeared above the left ear, and shortly after, another behind the right ear. She complained of severe headache, persistent vomiting, and constipation. During the preceding fortnight she had suffered from frequent shivering fits. On admission the patient was pale and pinched, pupils dilated, tongue dry and coated. Temperature 102° F., pulse 130. Paralytic convergent strabismus existed, the pupils were dilated and hardly reacted to a bright light. Optic neuritis was present in each eye. Upon the left side pus was found in the external auditory meatus, the posterior and upper wall of which was swollen and sinking forwards. A large baggy swelling extended over the whole left parietal and squamous regions and behind the mastoid, 2in. posteriorly to the meatus. Upon the right side the meatus was also full of pus, the membrana tympani was perforated, and there was an extremely tender and elastic swelling the size of a split walnut behind the mastoid process, but the mastoid region was normal and not tender. The diagnosis of suppurative otitis media, with extension into the mastoid cells of each side, was made, and, in addition, septic thrombosis of one lateral sinus; but beyond the fact of the falling in of the posterior wall of the right meatus, there were no symptoms indicating upon which side the disease was more serious or which sinus was thrombosed. The left mastoid antrum was opened in the usual way, and pus and caseous debris scraped out. The lateral sinus was exposed and found diseased. It was opened and cleared of its purulent contents, and the upper end plugged with antiseptic wax. The right mastoid antrum was also opened and scraped. The patient made a good recovery.

MILLIGAN (W.). "Thrombosis of the intracranial sinuses secondary to suppurative disease of the middle ear."—*Lancet*, April 20, 1895.

In the first case the patient, a man aged 25 years, had suffered from right-sided suppurative middle ear disease for many years. As the result of a severe chill acute symptoms set in, accompanied by pain over the corresponding temporal region and cessation of the discharge. The tissues between the mastoid process and the angle of the jaw became puffy, and pressure here was accompanied by severe pain. The condition of the patient gradually became worse, and frequent rigors ensued. The pain in the head increased and became more general. Right-sided optic neuritis was found to be present. The pupils remained equal and reacted to light. Under chloroform, the internal jugular vein was exposed, tied in two places, and divided. The sigmoid sinus was then exposed, slit open and scraped of its contents, which consisted of broken-down clot and puriform debris. The torular end of the sinus was at once packed with dry iodoform gauze, while the central end was irrigated

with warm bi-chloride solution. The cavity of the mastoid antrum was now opened up by extending the previous opening forwards, and a connection was made with the cavum tympani. All purulent debris was scraped out and the cavity irrigated. The patient made a good recovery.

In the second case the patient, a child aged 9, had suffered for a few days from post-scarlatinal otitis media. Secondary involvement of the mastoid cells ensued, accompanied by great pain and high fever. An opening into the antrum having been made, a small quantity of pus was liberated. The temperature declined, and the general condition improved for a few days, when a rapid rise of temperature followed, accompanied by frequently repeated rigors. The symptoms pointed to intracranial thrombosis and probably of the sigmoid sinus, and further operative interference was advised. This was declined by the relatives. The patient's condition gradually became more serious, when suddenly, symptoms pointing to retro-ocular abscess supervened. Great proptosis followed, accompanied by severe pain in the right orbit. The eyeball was excised, and a large quantity of pus liberated. The child began to recover immediately after this, and when seen nine months later was found to present a cicatrised membrana tympani, and to have practically normal hearing power.

DE ROALDES (A. W.) "Bromide of ethyl as an anæsthetic in otolaryngological practice."—New Orleans: L. Graham and Son.

THE author has made extensive trial of bromide of ethyl in cases where a short period of narcosis is desired. The subjoined table shows the class of case for which the author has used this anæsthetic.

	Operations.
Tonsillotomy (single or double).....	15
Opening of peritonsillar abscess	2
Fish bone in tonsil	1
Uvulotomy	2
Examination of nose	4
Intra-nasal galvano-cauterisation	6
Extraction of foreign body in nostril	2
Myringotomy	7
Removal of septal shelf	1
Adenotomy	40
Passing Eustachian catheter	1
Probing ear for diagnosis	1
Incision of furuncles	4
Scraping granulations in external auditory meatus	1
Snaring aural polypi	4
Wilde's incision and opening mastoid antrum	1

The advantages of the drug as an anæsthetic are:—(1) Its rapidity of action, 30 seconds to three minutes being sufficient. (2) Its short

period of excitement. (3) Its production at times of a complete analgesia, with comparative integrity of the mental faculties. (4) The rapidity with which the patient shakes off the narcosis. (5) The un-irritating properties of its vapours, hence perfect security against primary syncope or laryngo-reflex. (6) A relative absence of unpleasant after effects, such as nausea, vertigo, stupor. (7) The normality in most instances under its administration of both pulse and respiration. (8) Its portability as compared to nitrous oxide gas.

Its disadvantages are :—(1) Its action on the glandular system which excites hyper-secretion. (2) Its unavailability for prolonged operations. (3) Its comparative instability, which requires a pure freshly-distilled and properly-bottled liquid. (4) Its tendency to the production of muscular contractions.

Pathology and Bacteriology.

UNDER THE CHARGE OF A. SHERIDAN DELÉPINE, M.B., B.Sc.

“A brief review of the operations of the Home Department in connection with the cholera epidemic of the 23rd year of Meiji (1890).” Tokyo, Japan. [In English.]

On the 27th of June, 1890, two cases of cholera occurred in Nagasaki, and in a neighbouring village. The sufferers from cholera (proved bacteriologically), were coolies who had been unloading steamships from Shanghai and Hong Kong respectively. None of the crews of these vessels had suffered from vomiting and diarrhoea. It was afterwards discovered that other coolies previously engaged on the same work had died after suffering from vomiting and diarrhoea, but the cases were not reported until the men had been buried. At Shanghai and Hong Kong “cholera may be said to be a local disease.” The disease spread rapidly over the city. Cholera was independently introduced into the same prefecture at another port, again appearing among coolies who were unloading a ship from Shanghai on July 5th. The disease also appeared on a Turkish war vessel in the port of Yokohama on July 18th, after the ship had been lying at anchor there for forty days. Previously to this sporadic cases had occurred in Yokohama. After the disease broke out on the Turkish ship, the cases in Yokohama assumed an infectious character, and the suggestion is made that the vessel

had brought the disease with her, seeing that on her voyage she had called at some ports in India and China. From these centres the disease spread very slowly, as compared with previous epidemics, over Kinshin, Shikoku, and the middle and eastern parts of the main island. The total number of reported cases was 46,060, and the deaths were 35,248, giving a case mortality of 76.52. This was the first epidemic of cholera in Japan in which the efficiency of the Local Government System was tested. The local authorities carried out their preventive measures with some degree of success, as was shown by the "slow propagation, in spite of the violent and malignant character of the disease." They were thwarted, however, in their work by the repugnance of the people to removal to isolation hospitals, leading to concealment of the disease in mild cases, and to this fact the spread of the disease and the high case mortality were mainly due.

AMSTERDAMSKY. "The ways in which cholera spread in the Petrowsk Circle of the Saratow Government in 1892."—*Zeitschrift für Hygiene und Infectiouskrankh.*, XIX., s. 507.

KOERBER. "The cholera epidemic in Dorpat in the Autumn of 1893."—*Ibid.*, s. 163.

"The Annual Report of the Medical Officer of the Local Government Board for 1892-3."—London, 1894.

"Reports and Papers on Cholera in England in 1893."—London, 1895.

DELÉPINE and RICHMOND. "The variability of the comma-bacillus, etc."—*Journal of Pathology and Bacteriology*, 1895, p. 184.

IN the two first papers we have an account of two main methods by which cholera was propagated in Russia in 1892 and 1893.

In the Petrowsk district the disease was observed to arise at places situated on certain roads which ran through the district, and to spread from these places as foci. These roads were those along which tramping workmen (Boulaks) usually travelled through the district at certain seasons to and from the Volga neighbourhood. When cholera broke out along the course of the Volga, these tramps hurried homewards, and it was at the towns which were their usual stopping places that cholera first broke out. The first cases also in many of the villages on these routes were tramps. On further investigation of some of these epidemics, Dr. Amsterdamsky is of opinion that personal intercourse played the greatest part in the spread of cholera in his district. In Mokroje, 34 per cent of the members of infected families had cholera, whilst the attack rate for all the population was only 6 per cent. The seven introduced cases

were nursed by persons who were members of 30 families, containing 131 persons, of whom 30 had cholera, viz : the 7 primary cases and 16 nurses, leaving 7 only infected through the nurses. Thus, of these 108 persons not engaged in nursing, 7 or 6·5 per cent, had cholera ; a slightly greater percentage than that of all the district. In another village the disease spread amongst groups of relatives and connections, the groups varied in size from 2—17 persons. In Kondal, which is supplied with good spring water, the disease was introduced by Boulaks on twelve occasions. These were attended to by two male nurses, and were not visited by people from the village, only one secondary case occurred. In another place the disease was in each of three instances confined to persons who had been at a funeral feast. In one instance only was a water supply of the circle implicated.

Dr. Koerber made a careful investigation of the autumn epidemic at Dorpat. The epidemic was confined to one of the poorest quarters of the town, lying at the outskirts, on a low-lying sandy soil, close to the river. The area has but little drainage ; the streets and yards are mostly unpaved and very filthy ; some of the yards used as gardens ; in some cows, pigs, horses, and asses are kept ; the wells are either superficial or deep, and are in most cases liable to be polluted by surface water. The privies, situated in the yards, are very primitive, often full to overflowing, and in many cases the yards were soiled with fæcal deposits. That part of the area on the bank of the river is supplied with river water, and from the beginning of September to the end of October, among the 63 inhabitants of this quarter who drank unboiled river water, there were 13 deaths, 9 serious cases, and 7 slight cases of cholera, and among 134 who drank boiled river water, there were only 6 deaths and 3 severe cases of cholera. In one street in this quarter all the people boiled the river water, in another street all used water from tube wells, and no cases occurred in these streets. The epidemic in this quarter began shortly after a heavy fall of rain had washed impurities from the surface and subsoil into the river, and those who took their water from places below the opening of the sewer suffered in far larger proportion than those who took the water above the sewer.

That portion of the area supplied with well water remained free until a family fled from the river side into a house in the district ; other cases then were grouped around the well of this house after cholera had broken out among the fugitives. Cholera then appeared in a few days among the persons who drank of the two wells which lay nearest on the most frequented road to and from the infected house ; in another ten or fourteen days three other wells also on or near frequented roads had cases grouped around them, and finally, two wells at the city boundary gave the same results.

Koerber points out that foot passengers must have carried filth on their shoes from one part to another; that there was a considerable amount of rain while the epidemic lasted, and that from the beginning of the epidemic up to its climax, the ground water steadily rose. The surface wells and the imperfect deep wells must therefore have received faecal contaminations from those yards and gardens which were not kept clean. Analysis of the water of these wells showed great organic impurity. With regard to the wells suspected of causing cholera, analysis showed that whilst some were very impure, others were moderately pure, but in all it was proved that contamination with cholera excreta was possible. In one well, with moderately pure water, it was shown that soakage occurred from a drain, in the contents of which Koch's comma bacilli were found. It was known that cholera excreta had been put into this drain. The comma bacilli were also found in the water of the well. Twenty-four persons used the unboiled water of this well; 12 had cholera, and 12 escaped; 5 others in the same house used this water boiled, or water from other sources, and escaped. The remaining wells gave similar results; those who drank boiled water or water from other sources escaping the disease, even when engaged in nursing cases of cholera in the same house.

On the other hand, many wells which contained filthy water, teeming with bacteria, had no such grouping of cases around them. In several parts, where the yards and gardens were kept clean, there was no case of cholera. In one such place no case of cholera occurred until the owner was compelled to make his well public for the use of persons whose wells had been closed; shortly afterwards cholera broke out among the users of the well. It would thus appear that whether a well became infected or not was at Dorpat partly a matter of chance, and that the infection reached the wells from the soil. Seeing that Dorpat was free from cholera in 1894, Koerber concludes that the infective material did not survive the severe Russian winter.

In the one series of cases (Petrovsk) cholera appeared to be propagated by personal communication; in the other (Dorpat) personal communication seemed to play a very subordinate part, whilst the water supply seemed to be the medium of infection.

In England, in 1893, personal communication also seems to have played some part in the spread of cholera; whilst in only one case (Ashbourne) was the public water supply definitely infected. This occurred in a filthy yard behind a public-house, used as a common lodging-house. The soil was gravel. The houses in the yard had no back doors. Immediately behind the public-house, close to the leaking soil-pipe of the W.C. on the one hand, the urinal on the other, was the well. At the opposite end of the yard were two filthy closets for the

inhabitants of the yard; the drains in the yard leaked, and a gully situated one foot from the well often received fæcal refuse. The landlady of the public-house was the first case, September 4th. The well was closed on September 9th, up to which time 11 cases of cholera, with seven deaths, occurred among the 39 inhabitants of the yard; two other cases and two deaths occurred on the 10th, and two non-fatal cases on the 12th. These were the only cases of cholera in the neighbourhood. Possibly some slight unrecognised case was the origin. Koch's comma bacilli were found in connection with the cases, and also in the water of the well.

In 1892, cases of cholera arrived in England from Hamburg, Antwerp, Rotterdam, and Solombola (White Sea) arriving at ten English ports. In only four places were our first lines of defence broken, viz., three cases from Grimsby seized with cholera at Liverpool, three from Harwich at London, one from Wisbech (port) at Bridgewater, and one from River Tees (port) at North Shields. The cases were isolated, the infected ships, rooms, etc., cleansed and disinfected; the baggage, clothing, and effects of the infected cases burnt or disinfected, and the corpses of those who died of cholera buried with antiseptics. No cases arose except among those who had arrived from abroad.

In 1893, up to the end of July, seven cases reached English ports — Liverpool, Cardiff, the Tyne, and London; but there was no spread of the disease beyond the ports. Cholera cases arose afterwards at six other ports, and only in two cases did the disease extend beyond the port, i.e., the district under the jurisdiction of the port sanitary authority. Cases occurred in 49 separate provincial and 15 metropolitan districts, singly in 42 and 14 respectively. In one metropolitan district there were three cases, and in only five provincial districts did the attacks exceed five in number. Not including the imported cases, there were 287 cases with 135 deaths. The outbreak at Grimsby is of great interest. Grimsby has a low-lying site. The soil is composed of alluvium on a subsoil of clay overlying the chalk; about one-ninth of the houses are supplied by wells bored through the clay to the chalk, and many of the wells are insufficiently protected against surface pollution. There being few water-closets in Grimsby, fæcal and house refuse are deposited in moveable wooden boxes, emptied once weekly into a scuttle, which in turn is emptied into a cart for removal from the town. These boxes often leak or are over full, and sometimes have to be taken through the house, so that there is ample opportunity for escape of fæcal material. The slop-water drains into a catch-pit in the backyard, and this into the sewer, the disconnection from which is often imperfect. In some cases this slop-water contained cholera excreta. The street gullies and rain-water pipes also are imperfectly trapped. Finally, the sewage, on

account of the insufficient gradients and the closure against the tide for most of the day, is stagnant in the sewers, which are often over full. Towards the middle of July diarrhoea of the ordinary "summer" type was more prevalent in Grimsby than in other English towns, the fatal cases being those of children and aged persons. In August, however, deaths of 15 persons, aged from 11 to 49, were registered as being due to "English cholera," "cholera nostras," "choleraic diarrhoea," and "cholera morbus," a majority of the cases having been ill only twenty-four hours or less. The first case among these came from Antwerp, where cholera had broken out. He died in the hospital ship and was buried on shore. The two next were engaged about the docks, but had had no communication with the first or with each other. Cases continued to occur, and when it was discovered that cholera had become established in Grimsby, notification of diarrhoea was established on September 1. From data acquired before and after this day, it was found that 127 cases of cholera had occurred in Grimsby from August 12 to October 3, and that 35 of these had died. Of the 127 cases, 13 only drank well water, and of these two died. The first cases drank town's water derived from artesian wells of pure quality. No connection, therefore, can be made out between the water supply and the outbreak. The milk supply gave rise to no suspicions. Personal communication was only established in three groups, containing 7 cases in all. The path of infection can, therefore, only be guessed at. In some cases the symptoms came on after eating cockles or fish. The cockle-beds lie between two sewage outfalls, and are thus liable to be contaminated, but seeing that cockles are usually cooked by boiling, they can only be considered adjuvant causes of the disease. [Fish has been known to cause fatal choleraic diarrhoea in times when cholera is not prevalent, but we know from Kleb's researches that Koch's comma bacilli can grow on fish-muscle, and form powerful poisons, partly capable of withstanding a boiling heat and of causing choleraic symptoms in animals.] The view that fish was partly to blame for the outbreak is strengthened by the fact that in several parts of England, *e.g.*, Owston Ferry (Lincoln), Clerkenwell (three cases from one shop), cases of cholera occurred in persons after the consumption of fish which had come from Grimsby. In this connection it may be mentioned that a case of cholera, probably of local origin, arose on a vessel in the Alexandra Dock, and was followed by two other cases on the same vessel. Shortly afterwards diarrhoea became very prevalent on all the vessels in the dock, and "to a less extent on board the fishing smacks."

In that part of Cleethorpes which adjoins Grimsby, one fatal case occurred, and in Cleethorpes proper, about one mile away, there were ten cases, with six deaths, from August 15 to September 8. The origin

of these cases was not cleared up. Opposite the village of Cleethorpes, below low water mark, is a large collection of oyster and mussel beds, lying between the three sewage outfalls of Grimsby and that of Cleethorpes. These beds must have been reached by cholera excreta, in however dilute a form. The oysters were brought from the beds as required, and the surplus stock was stored, for a short time only, in the Fish Dock, near which there is a sewer outfall. The water of this dock gave bacteriological evidence of sewage pollution. This surplus stock apparently formed only a small fraction of the vast quantities distributed from Grimsby, but unfortunately no account was kept of its destination. In various parts of England, cholera occurred in persons who had shortly before eaten oysters and mussels from Grimsby. At Grimsby, however, no case could be attributed to the consumption of oysters or mussels, although "open" mussel beds are numerous on the coast, and from these mussels are collected for local consumption. Cases after eating oysters or mussels from Cleethorpes, viâ Grimsby, occurred in persons, who had not been in a place where cholera prevailed, living at Manchester, Appleton-le-Street, Yarmouth, Bradford, Doncaster, Bethnal Green, and Mansfield.

At Lincoln and Rotherham two cases occurred, in persons who had eaten oysters at Cleethorpes the day before the attack. At Leicester there was a case, at an oyster shop supplied with Cleethorpes' oysters. At Newcastle-on-Tyne a case occurred, at a fish shop, in a person who had eaten "Dutch native oysters" three days before. Some oysters from the same batch, on bacteriological examination, yielded no comma bacilli. In nearly all the cases mentioned, or in cases associated with them, Koch's comma bacilli were found in the stools.

At Hull 17 cases (seven fatal) of cholera occurred from August 24 to September 26, and 152 cases (five fatal) of choleraic diarrhoea from September 2 to October 11. Enteric fever and diarrhoea of the common type were unusually prevalent before the choleraic form was noticed. The town occupies a hollow basin in the chalk, which is overlain by a layer of clay of varying thickness, merging into silt where it joins the chalk. It is intersected by the River Hull and great land drains. The sewers on the Eastern part are tide-locked a great part of the day; on the Western side the sewage is pumped into the Humber. Cholera affected approximately those parts in which diarrhoea and enteric fever prevail, and where there is a great want of free ventilation.

The excreta are mostly placed, along with house refuse, in small midden-prives, the contents of which are sold to farmers for manure. A suspicious case occurred on August 16th, and ended in a recovery. On the 23rd of August seven boys bathed in the Holderness high level drain, which drains agricultural land manured with night-soil and in its

course receives sewage in Hull. They swallowed some of the water. Three of these boys suffered from diarrhoea, one vomited soon afterwards and seemed none the worse, one had nausea for an hour or so and one seemed unaffected. The seventh died next day of cholera. There was no proof of the introduction of cholera excreta into the drain, but Klein found that the water of the drain deposited greyish translucent flocculi on standing, and gave, on cultivation, comma-shaped bacteria which resembled those of Koch in their action on guinea-pigs and in their growth upon agar, but differed from Koch's in their rapid growth on gelatine and their rapid liquefaction; whilst Koch's comma bacillus (*vibrio*) grows best at 37°, this *vibrio* grows best at 20°.

Beyond this case there was no proof of any connection with water in the Hull cases. The milk was not suspected. Personal communication did not play any marked part in the spread.

At Ilkeston the water supply was polluted by sewage, but no vibrios were found in the water. Four cases of cholera occurred, three in members of one family, and the fourth was a night-soil man. There was no history of primary infection. At North Bierley a group of seven cases occurred in members of related families drinking Bradford water. At Appleton-le-Street a similar group of five cases occurred; here the well was liable to pollution, but Klein could find no vibrios in it. At Middleton, near Manchester, a group of three cases. In Manchester there were two groups of two cases each. At Owston Ferry a group of three cases. At Keighley a group of four cases. At Crondall two groups of three each. In many of the cases no probable origin could be suggested. In Manchester there were four cases reported; these occurred in two families. In one group a man fell ill on the 11th September, the day after his return from Grimsby; he slowly recovered, but his wife, who nursed him, was seized with cholera on the 14th and died next day. Their daughter-in-law, who nursed them, remained in good health. In the other group a woman fell ill shortly after partaking freely of oysters which had come from Grimsby. Her husband and a friend, who had also eaten oysters with her, remained well. The mother of this woman, who lived in the same house with and nursed her daughter, fell ill shortly after her daughter. The daughter died, the mother recovered. In connection with the three last cases comma bacilli were found, which behaved like those described by Koch.

J. Richmond.

Reviews.

"The Prevention of Smallpox, with Special Reference to the Origin and Development of the Stamping-out System." By Professor EDGAR M. CROOKSHANK, M.B., J.P., Professor of Bacteriology at King's College, London, and author of "The History and Pathology of Vaccination." London: H. K. Lewis.

At last the antivaccinists' Sphinx has spoken. After many supplications, a medical man and antivaccinist, Dr. Crookshank, has been tempted to speak out, to lay down the law, offering a scheme that is to replace the mystic vaccination, and which, if carried out, will stamp out smallpox. This scheme is expounded in the course of an Inaugural Address delivered before the Medical Society of King's College, London, on October 26, 1894, and now printed for circulation in a pamphlet of 40 pages. The views expressed by the author practically tally with those given by him before the Royal Commission on Vaccination at much greater length, and to be found in print at pages 1—123 of the Fourth Report.

Antivaccinists have always claimed Dr. Crookshank as their own: have seized upon his words from time to time, and given his opinions (modified, if necessary) to their listeners, in order to show that medical and expert experience was on their side. The present pamphlet will, we think, go far to put a stop to this, for we have now placed before us an impracticable scheme—impracticable, at least, from an antivaccinist point of view, for instead of running down the principle of compulsion, the author suggests it wholesale and indiscriminately. Compulsory isolation and compulsory notification: everything made compulsory by the order of the State. Such is practically Dr. Crookshank's scheme! Further than that, here and there throughout the pamphlet peeps forth the scientific man, with hints of toxines, antitoxines, vaccination as a preventative against variolous attacks, etc.,—words and phrases which are warranted to be of the nature of red rags to those who hitherto have claimed Dr. Crookshank as a pronounced advocate of their antivaccinist tenets. In fact, there will be some amongst them who will wish that this modern Sphinx had followed the example of his Egyptian ancestor, and refused to be drawn! Still, as Dr. Crookshank has spoken, we are able now to criticise what he has said.

The commencement of the pamphlet is devoted to a comparison between the plague and smallpox, with a short description taken from Dr. Vivian Poore, Dr. John Allen, Pepys, Pinks, Dekker, Simon Kellwaye, and others, of Old London, as a suitable environment for the

development and extension of such diseases, what with the filth of the city, the drunken, dissolute, and scorbutic nature of the people, and the ignorance of the quacks. The different outbreaks of plague in London are mentioned and also the various remedies suggested (whether by the State or by physicians and others), showing the gradual rise and progress of preventive measures, until we are brought down to the date of the Great Fire of 1666, when our bacteriological professor tells us (on page 15) that "London was sterilised," and the plague stamped out. About half a century afterwards, the plague having made its appearance in France, Dr. Richard Mead drew up a series of preventive measures for England (*e.g.*, quarantine, notification, isolation, disinfection, etc.), to be carried out under a Council of Health, whilst general sanitation was to be carefully attended to. Then follows a very short *resumé* of the origin and progress of smallpox. It is traced from the East (probably Egypt), but the exact date of its importation into England is not ventured upon, though its steady increase during the seventeenth century (*i.e.*, Sydenham's time), and the absence of public measures to cope with it, are mentioned. During the eighteenth century, the method of *protective inoculation or variolation*, derived also from the East, and introduced into England by Lady Mary Wortley Montagu, whose infant was inoculated in 1721 by a Mr. Maitland, surgeon, became established as the orthodox method of preventing smallpox. We look in vain to Dr. Crookshank at this point for any mention in detail of the facts (1) that inoculation without subsequent isolation naturally brought this method of treatment into bad repute, it being now well established that, where such a remedy was resorted to, more people suffered from smallpox; (2) that the fatality of the disease imparted by inoculation was found to be less than that of natural smallpox (an important scientific fact, be it noted). Dr. Crookshank simply states on page 21 that "inoculation protected the individual when genuine smallpox was produced"—an admission made, we think, in sarcasm, but nevertheless having an important bearing upon the vaccination controversy, as we shall see later on.

Inoculation (as then carried out) becoming a spreader of smallpox, Dr. Haygarth suggested an alternative scheme—his "Rules of Prevention," *i.e.*, notification and isolation, which were to be made compulsory by legislation. Finally, inoculation was made illegal by Act of Parliament in 1840, but Dr. Crookshank does not tell us, as he ought to have done, that the same Act of Parliament (3 and 4 Vict. c. 29) legalised and encouraged vaccination, a system which had been introduced and made known 42 years previously by a country practitioner, Edward Jenner, in a pamphlet published in 1798. Forty-two years is a long period during which this new system (vaccination) was scientifically tried and

tested, with the result that it was proved to be of greater value than inoculation, and therefore ought to supersede it. This gradual transition was the result of experience, and the State accordingly stepped in with its Act of Parliament to supersede the crude and unscientific inoculation by the scientific and more valuable vaccination. Such is the common-sense view of the history of vaccination at this time; but, as we should have expected, Dr. Crookshank does not take it. In fact, at this point of his pamphlet, he shows his teeth, and we propose, therefore, to follow him somewhat closely. He commences by stating on page 25 (talking of the introduction of vaccination) that Dr. Jenner "pronounced the new lymph to be protective for life," and then he stops. Surely Dr. Crookshank might have taken the trouble to read the interesting letters and notes of Dr. Jenner which are to be found in an acknowledged authority and standard work—Dr. John Baron's "Life of Jenner," published in 1838, and from which he would have noted that "Dr. Jenner also considered smallpox and cowpox as modifications of the same distemper; and that in employing vaccine lymph, we only use means to impregnate the constitution with the disease in its mildest, instead of propagating it in its virulent and contagious form, as is done when smallpox is inoculated. The name which Dr. Jenner gave to the former, *variola vaccina*, sufficiently and strongly indicated his sentiments on this head." The prophylactic powers of this vaccine lymph are again and again stated by Jenner in his letters and notes as follows: "If properly conducted this vaccine secures the constitution as much as variolous inoculation possibly can; it is the smallpox in a purer form. . . . The security given by vaccine inoculation is exactly equal to that given by the variolous, and to expect more from it would be wrong. . . . As failures in the latter are constantly presenting themselves, we must expect to find them in the former also. . . . An inoculated person has subsequently been infected with smallpox on exposure to its influence. Just so with vaccine. . . . As we have such abundant testimonies of persons having the smallpox a second time, why may there not be exceptions to the cowpox giving security in every instance of inoculation? . . . Duly and efficiently performed, vaccination will protect the constitution from subsequent attacks of smallpox, as much as that disease will. I never expected that it would do more, and it will not, I believe, do less. . . . The cowpox must possess preternatural power, if it would give uniform security to the constitution, when it is well known the smallpox cannot. . . . Dr. Jenner admitted that smallpox might succeed perfect vaccination, just as smallpox does succeed smallpox" (*vide* pp. 162, 241 of Vol. I., and pp. 15, 26, 28, 30, 134, 159, 233 of Vol. II.). We give the above few quotations (out of many) to show that Dr. Crookshank, if he knew of them, is

guilty of an apparent error of omission. But we will let this pass, and turn our attention now to page 27 (in part at least), containing sentences of a somewhat intricate and involved nature—so involved indeed that we will give the actual words. Dr. Crookshank states, "It is true that smallpox, which began to decline before vaccination was introduced, continued to do so, and there was no epidemic for many years, but that this was due to vaccination, or that vaccination is capable of extirpating the disease, or of controlling epidemic waves, is absolutely negatived by the epidemic in 1825, and the epidemics which followed in quick succession in 1838, in 1840-41, 1844-45, 1848, 1851-52. Vaccination was made compulsory in 1853, but epidemics followed in 1854, 1855, and 1856, in 1859-60, and in 1863, 1864, and 1865, culminating in the terrible epidemic in 1871-72, with more than 42,000 deaths. Epidemics followed in 1877 and 1881. Among recent examples we may take the now historical epidemic in Sheffield. It was calculated that 98 per cent of the population were vaccinated, and yet there were 6,000 cases of smallpox at a cost of £27,000 to the local authorities, whilst the pecuniary loss to the town was enormous. This is a terrible result, and occurred in a town reported to be one of the best vaccinated in the United Kingdom."

Dr. Crookshank should have taken a few pages in which to explain what he has jumbled together in a few lines without any regard for sequence or chronology, whilst omissions, as we shall show, are numerous. 1798 is the year in which Jenner published his pamphlet on vaccination, a method of treatment, by the way, which was not at first believed in, and yet Dr. Crookshank would have us believe that an epidemic in 1825 "absolutely negatived" the value of this new treatment! He does not tell his readers that inoculation was rife at this particular time, causing widespread epidemics of smallpox all over the country. So, too, in regard to the epidemics of 1838, 1840-41, 1844-45, 1848, 1851-52; to understand them, Dr. Crookshank ought to have stated that the first *attempt* at making vaccination compulsory (after making inoculation illegal in 1840), was in 1853, and that this was only an *attempt*, for on reference to the Act of that year, 16 and 17 Vict. c. 100, we find that it was an Act further to extend and make compulsory the practice of Vaccination, *i.e.*, compulsory for all infants within three or four months of their births. No effectual means (*e.g.*, compulsory appointment by Boards of Guardians of Public Vaccinators, etc.) were taken to enforce it until the Vaccination (Amendment) Act of 1871, so that the epidemics mentioned—1854, 1855, 1856, 1859-60, 1863, 1864, 1865, and even the "terrible epidemic" of 1871-72—show nothing. Vaccination was purely optional during the whole of this time, and the only way in which these epidemics could have taught us anything about vaccination would have

been by statistics showing the number vaccinated and unvaccinated, with the different age-incidences of those who were attacked with, or died from, smallpox. We turn to Dr. Crookshank for information, and what do we find? All that he tells us about the 1871-72 epidemic is that it was "terrible," and showed a mortality of "more than 42,000 deaths"! Not a word is said as to how many of these sufferers from smallpox had been vaccinated, how many were unvaccinated, how the mortality compared with that of prevaccination days, the age-incidences, the proportion of smallpox deaths to deaths from all causes, etc., etc.; nor, indeed, is any mention made of the following well-known statistics:—

A.—LONDON STATISTICS SHOWING SMALLPOX DEATHS PER 1,000 FROM ALL CAUSES.

1671-80	= 66
1771-80	= 97
1871-80 (including the great 1870-71 epidemic) =	20

B.—MEAN ANNUAL DEATHS FROM SMALLPOX PER MILLION LIVING AT SUCCESSIVE AGE-PERIODS.

	All ages.	0-5	5-10	10-15	15-25	25-45	45 and upwards.
(1) Vaccination optional, 1847-53 ...	305	1617	337	94	109	66	22
(2) Vaccination obligatory but not efficiently enforced, 1854-71...	223	817	243	88	163	131	52
(3) Vaccination obligatory but more efficiently enforced by vaccination officers, 1872-87.....	114	242	120	69	122	107	47

These are the Registrar-General's statistics, and we might excuse Dr. Crookshank for not having mentioned them, because the necessary re-working out of such statistics (which, no doubt, he questions) might be irksome; but when he comes to treat of the Sheffield epidemic in 1887-88, and merely states, "That 98 per cent of the population were vaccinated, and yet there were 6,000 cases of smallpox at a cost to the local authorities of £27,000, while the pecuniary loss to the town was enormous," we confess we feel as if we were reading extracts from the *Anti-vaccinists' Inquirer* or other similar periodical. Surely Dr. Crookshank is cognisant of a scientific report written by Dr. Barry, who shows, as the result of his own most elaborate and painstaking researches into that Sheffield epidemic, that "of the 268,397 vaccinated persons only 1.5 per cent were attacked by smallpox, and .07 per cent died; whilst of 5,715 unvaccinated, 9.7 per cent were attacked and 4.8 per cent died; i.e., vaccinated persons (including children) enjoyed a 6-fold immunity from an attack of smallpox and a 68-fold security against death from smallpox, as compared with the unvaccinated (including children). Further, the vaccinated children under 10 years of age enjoyed a 20-fold immu-

nity from attack of smallpox, whilst the deaths amongst the vaccinated children of the same age-period were only a total of nine in number by the end of the epidemic—a number which would have been increased (taking the unvaccinated percentages) to 3,429, had it not been for vaccination. Under 5 years of age, of the vaccinated children 36 per cent were attacked and 8 per cent of these died; whereas of the unvaccinated 65 per cent were attacked and 51·5 per cent of these died (excluding infants aged under one month).” *

Other important omissions may be mentioned here. Thus, pages 27 and 28 are devoted to a paper by Sir James Y. Simpson, published in 1868, in which isolation is stated “to be the leading and chief measure required to stamp out smallpox.” Dr. Crookshank makes much of this, adding that Sir James spoke approvingly of the Sanitary Act of 1866 for England and Ireland, and more approvingly of the Public Health Act of 1867 for Scotland; but he forgets to add that Sir James makes a condition to such isolation in the following words (we quote the original paper):—“One of the chief points to attend to in isolation,” says Sir James, “is the surrounding of the sick (smallpox) with nurses and attendants who are themselves incapable of being affected, in as much as they are known to be protected against the disease by having already passed through cowpox or smallpox.”

Again, touching upon Leicester and the smallpox epidemic there of 1892-3, Dr. Crookshank compares it with that in 1871-2, stating that in the latter there were 6,000 cases of smallpox. We should like to know where Dr. Crookshank gets his figures, for we find that the then Medical Officer of Health (Dr. Crane), in his reports, calculates the cases at about half this number, whilst even Mr. Councillor Biggs before the Commission, in giving the anti-vaccinists’ evidence, puts the figures at the same estimate. But this by the way. Allowing Dr. Crookshank’s figures, we should like to ask him, whether in fairness he ought not to have stated that it is not known how the vaccinated suffered as compared with those unvaccinated, how the age-incidences of those that suffered come out, etc.

On page 30 Dr. Crookshank states, “We have been controlling smallpox by means of sanitary legislation,” quoting the various Acts of Parliament passed since 1866 that bear upon the public health. This statement, coupled with his comparison and classification together of the two diseases plague and smallpox, warrants us in assuming that Dr. Crookshank looks upon them as due to insanitary and filthy conditions, if not as to their origins, at least as to their propagations and disseminations. And yet not a word is said as to the significant facts brought forward by the Registrar-General, who shows that the general death-rate

* See Dr. Barry’s Report, pp. 171, 175, 178, 179, 192.

in this country during the period of 50 years 1838-87 has decreased 9 per cent, that of smallpox 72 per cent, the latter further being entirely limited to those under 15 years of age. But one explanation can be put upon these figures, *i.e.* that whilst sanitation may have lowered the smallpox (as it has the general) death-rate 9 per cent, there is still 63 per cent to be accounted for by vaccination; and further, that it is contrary to common sense to suppose that sanitation would lessen the smallpox mortality in those below 15 years of age and increase it in those over that age-period. The sanitation theory, therefore, falls to the ground again, because it is not borne out by facts (*vide* First Report of the Royal Commission on Vaccination, pp. 15 and 16).

On page 32 mention is made of the Metropolitan Asylums Board Report, 1889, and the Marylebone Epidemic, 1894, the former as showing the value of notification, the latter as confirming the benefits from notification and isolation. The importance of notification and isolation is admitted certainly, but not without mention being made of the powers of vaccination and revaccination in modifying and preventing smallpox attacks. In fact, Dr. Wynter Blyth's report in connection with the Marylebone outbreak is specially noteworthy in this respect. He states, "The outbreak affords strong evidence of the immunity conferred by vaccination . . . and the efficacy of vaccination and especially of revaccination. Out of 101 cases 36 were unvaccinated (21 under 7 years of age), whilst of those vaccinated in infancy 6.9 per cent were between 7—14 years of age, 17.8 per cent were 14—21 years, and 39.6 per cent were 21 years and over." But not a word of this is mentioned by Dr. Crookshank. Why?

As an addendum, on pages 34 and 35, a few remarks are offered upon the stamping out of animal plagues, the communicable diseases of live stock which may be compared with human smallpox, *e.g.*, cattle plague, sheep-pox, foot and mouth disease. "These three great animal plagues have not only been suppressed, but driven out of this country by the stamping-out system," *i.e.*, notification, and the completest of all isolation, *viz.*, slaughtering. So says Dr. Crookshank, and asks therefore, why not smallpox, without (be it added) recourse to such "complete" isolation! Cattle are not human beings, and this reply suggests itself.

In conclusion, Dr. Crookshank, on pages 36—40, formulates a scheme for smallpox prevention, the items of which may be summed up in the Keir-Hardian words—"nationalisation of compulsory measures," *e.g.*, compulsory notification, compulsory isolation in compulsorily provided hospitals, and compulsory disinfection. These compulsory measures are to be international, with a permanent international Board of Health, and a heavy penalty (say £50) for any medical man or householder who

fails to notify, not only smallpox, *but any case which may reasonably be supposed to be smallpox*, as we may remark is the case in New Zealand with her Notification Act.

Theoretically, such a scheme is good ; practically, such a scheme is bad, and that for the simple reason that there is an innate "cussedness" in human beings which will inevitably prevent a wholesale interference with their liberties. As was said in Jenner's day, when similar measures were suggested, "they were rendered difficult of execution by the liberty claimed by people of this country of following the bent of their own inclinations." Even at that time anti-vaccinists were many.

Dr. Crookshank apparently does not think so, but would call upon the Legislature to concern itself with impracticable measures, whilst he would "select the nurses and other attendants, whose duties bring them into contact with smallpox, from those who have recovered from an attack of the disease ; and failing this, they might prefer, with good reason, to be inoculated with due precautions with smallpox lymph" (page 38)! When we remember the purpose for which this pamphlet was written, this last suggestion to be found at the end is certainly of the nature of an anti-climax.

PUBLICATIONS RECEIVED.

From W. F. Clay, Edinburgh :—

"Diseases of the Spinal Cord." 3rd Edition. (16s.). By BYRON BRAMWELL, M.D., F.R.C.P. Ed., F.R.S. Ed.

From the Dublin Sanitary Association :—

Report of the Council for 1894.

From Oliver & Boyd, Edinburgh :—

"The Diseases and Deformities of the Fœtus." Vol. II. (10s. 6d.)
By J. W. BALLANTYNE, M.D., F.R.C.P. Ed., F.R.S. Ed.

From Smith, Elder & Co., London :—

"Indurative Mediastino-Pericarditis." (5s.) By THOMAS HARRIS, M.D., F.R.C.P.

From Gale & Polden, London :—

"The Theory of Physical Education in Elementary Schools." (2s. 6d.) By THOMAS CHESTERTON.

THE MEDICAL CHRONICLE:

A MONTHLY RECORD OF THE

Progress of Medical Science.



OZÆNA: ITS PATHOLOGY AND TREATMENT.

By SIEGMUND MORITZ, M.D., M.R.C.P., Lond.,

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THOUGH a disease of the nasal fossæ, accompanied by a penetrating and disagreeable odour, was already known to Pliny¹ and Celsus², and has been the theme of numerous writers, old and new, though ozæna is by no means a rare disease, and though its pathology has been made the subject of many experimental and practical observations, we still seem far from a final solution of the questions raised by Fraenkel³ at the International Medical Congress held in London in 1880—What is the cause of ozæna? What is the cause of the odour? The answer is the decomposition of the secretions. But not all decomposing secretions of the nose have the specific smell of ozæna. Is the decomposition therefore caused by a specific ferment? Is it a special mode of decomposition with which we have to do here? And we might ask further, Is the disease with all its symptoms due to the micro-organism which has since been found in ozæna, or is the atrophy of turbinated bodies and mucous membrane the primary cause? Further, is this atrophy itself congenital or a consequence of a preceding disease? These and a number of other questions wait still for their final solution.

Primarily, of course, ozæna, from ὀζή, a stench, is the name only for a symptom—a disagreeable odour from the nose. Various diseases of the nose may be accompanied by a disagreeable smell; it is frequently found together with caries of the nasal bones, with syphilitic ulceration, and with abscess of the antrum, but according to the majority of those

who have large experience in nasal diseases, the smell of the so-called ozena simplex, or genuine ozena, is distinct from that which accompanies the above-named conditions. Alone among recent writers in this respect stands Schmidt,⁴ who says that the odour in all nasal disorders accompanied by a smell—with the exception of empyema of the antrum, where the smell is simply putrid—is identical, and that it is only a difference in degree, whilst the characteristic “bouquet” is the same.

Though not by any means a rare disorder, it will, perhaps, not be superfluous to describe the symptoms of ozena simplex. Trousseau⁵ was one of the first who distinguished simple ozena. “When we are able to exclude an inflammation of the mucous membrane, a necrosis of the nasal bones, when the patient appears otherwise in flourishing health, then we see ourselves forced to admit that the nasal secretion has a *special* fœtor, and to this form the name of constitutional ozena should be reserved.”

The patient affected with this disease might be otherwise in perfect health. He has, perhaps, a dry sensation in his nose and in his throat. The friends of the patient complain of the penetrating and most disagreeable stench, which may be perceptible at a distance, and can often be perceived on entering the room where the patient may be. This odour is sometimes perceived by the patient himself, but usually his sense of smell is considerably diminished and often abolished. Some patients complain of frontal headache, more or less persistent. On examination, the nasal fossæ are usually found abnormally wide, the mucous membrane pale and dry and more or less covered with greenish black crusts. Often a similar condition of the fauces and the posterior pharyngeal wall is found to accompany the nasal disorder, and the mucous membrane here also may be covered by adherent black crusts. These are frequently also seen in the naso-pharynx. The crusts adhere firmly, and when removed, a sparing exudation of glary mucus at once takes place. The mucus can be seen to exude at single points in the form of minute greyish drops, so that the mucous membrane has the appearance of being dusted with flour; these minute drops enlarge, run together, and form then a continuous layer, which soon dries up and forms the crusts. The characteristic bad smell adheres to the crusts, and with the thorough removal of these, the odour disappears.

It is unnecessary to describe the penetrating and disagreeable odour, which makes the life of the patient a misery to himself and his surroundings. One of the most picturesque descriptions of it is given in the ordinary French term for ozena—“la punaise” (from la punaise, the bug).

The middle and lower turbinated bones, especially the latter, are usually found atrophied, and the nasal passages are therefore abnormally

wide, so that frequently the posterior pharyngeal wall may be easily inspected by anterior rhinoscopy. The nasal mucous membrane is also usually atrophic. Occasionally the nasal passages appear of normal width, and rarely they are even abnormally narrow.

The disease usually commences in youth, somewhat rarer in childhood; it is more frequent in women; out of 170 cases observed by Jurasz, 110 were females, 60 males.

What is the cause of the persistent and disagreeable odour? It lay near, of course, to suppose that it is due to some micro-organism. It might have been thought, and it is still usually mentioned in text-books, that the nose harbours a multitude of micro-organisms; but so far from this being the case, the number of micro-organisms found in the healthy nose is remarkably small. Hajek⁶ and Loewenberg,⁷ and quite recently St. Clair Thompson and R. T. Hewlett,⁸ have investigated the bacteriology of the healthy nose, and find that micro-organisms in the mucus of the interior of the healthy nose under normal conditions are by no means abundant. In more than 80 per cent of the cases on which Thompson and Hewlett made their observations, the mucus was found completely sterile.

The scarcity of microbes in the healthy nose points strongly to the fact that the micro-organism which Loewenberg⁷ always has found in ozaena is really characteristic of this disease.

Loewenberg's researches have been confirmed by Abel.⁹

According to Loewenberg⁷ one finds constantly in thin layers of the characteristic crusts of ozaena, but especially in the mucous threads removed between the septum and turbinated bodies, a micro-organism present in abundance. These mucous threads contain almost pure cultivations of the microbe. It is a diplococcus, but on account of its almost cylindrical shape Loewenberg calls it a "cocco-bacillus." It is easily stained by fuchsin, gentian-violet, and other aniline colours, but, in contra-distinction to Friedländer's bacillus pneumoniae, which it otherwise greatly resembles, it is not stained by Gram's method. It possesses a distinct capsule. This coccus was first described by Loewenberg, in 1885, then independently by Klamann,¹¹ by Thost,¹² and also by Hajek.⁶

Loewenberg made cultivations of this coccus on gelatine plates. These are easily developed at ordinary temperature. They appear, firstly, as small, round, compact colonies of yellowish colour, taking up the whole thickness of the plate; or, secondly, as large, semi-transparent colonies of a milky-white colour, occupying only the surface of the plate. They do not liquify the gelatine. Both forms of colonies contain the same microbe; the colonies first-mentioned, when left in contact with air, gradually become like the second form. Even in dry cultiva-

tions the cocci retain their vitality for several months; they also grow on acid gelatine in a temperature up to 44° C., but they die in contact with water at a temperature above 54° C., a point which is important in the treatment of ozæna. Cultivations of the ozæna-cocco-bacillus, whether grown on gelatine or on agar-agar or on potato, possess an odour, but not the disagreeable characteristic odour of ozæna; in fact, they all possess a more or less agreeable smell; the cultivations grown on gelatine smell somewhat like lilac. Loewenberg states that besides the micro-organisms which he describes as pathogenic for ozæna, the nasal mucus of ozæna patients contains remarkably few other forms of microbes.

In a patient affected with a very fetid syphilitic ulceration of the nose Loewenberg found some micro-organisms, but not the ozæna-cocco-bacillus. The cocco-bacillus-ozænae, though it resembles Friedländer's bacillus pneumoniae, shows, according to Loewenberg's researches, distinct differences in regard to the stains which it accepts, in regard to the appearance of the cultivations, and in regard to the symptoms which it produces when inoculated in animals.

Loewenberg was not able to produce ozæna by the introduction of cultivations in the nasal cavities of animals, and he does not mention that he has succeeded in discovering the ozæna-coccus in the tissue of the affected mucous membrane. The proof, therefore, that the micro-organism discovered by him is really pathogenous for ozæna remains still incomplete, though it seems probable that there is an intimate connection between this micro-organism and the disease.

Many rhinologists, so, also, in a recent paper, Réthi,¹² of Vienna, ascribe to the micro-organism only a secondary rôle, and they consider the other pathological changes, macro- and microscopical, as all-important. It seems to me that the careful and elaborate researches of Loewenberg cannot be simply set aside, and it appears probable that, just as the tubercle bacillus has to fall on a suitable soil to produce phthisis in man, so the cocco-bacillus of Loewenberg has to meet with peculiar preformed conditions in the nasal passages to produce ozæna.

As before mentioned, we find in ozæna very frequently an atrophy or ill-development of the septum, the lower and middle turbinated bodies, and of the mucous membrane covering the same. The question arises—Is this condition partly or entirely congenital, and, therefore, a predisposing cause for ozæna? or is it secondary, a consequence of the disease, which, according to those who accept the latter opinion, commences as a hypertrophic catarrh leading to the atrophy secondarily?

Zaufal¹³ was the first who saw the cause of ozæna in the rudimentary development of the lower and middle turbinated bodies. On account of the width of the nasal passages, the expiratory current had not the

necessary force to eject the secretion, which remained back in the nasal cavity, dried up, and became decomposed through the addition of micro-organisms.

Though Zuckerkandl¹⁴ could never find a congenital defect of the turbinated bodies, and though most authors see in the width of the nasal cavity a consecutive condition, brought on by atrophy following hypertrophy, Hopmann¹⁵ has recently proved that the osseous deformities so frequently met with in ozaena are congenital. His investigations show that the septum in cases of genuine ozaena is shorter in its antero-posterior diameter and the naso-pharyngeal space in its antero-posterior diameter always deeper than in healthy individuals. Hopmann has designed a simple instrument, which enables those measurements to be taken, and as the absolute measurements of the septum and naso-pharynx vary greatly in different individuals, he has, to obtain comparisons, reduced the two measurements to a proportion. He takes first the diameter from the point of the nose to the posterior pharyngeal wall A, then draws his little rod-like measure, which at its end possesses a small hook bent off at a right angle, forward to the posterior margin of the septum, and measures again, and obtains in this way the septum diameter B. B subtracted from A gives the depth of the naso-pharynx C. He found A to vary from 90 to 122 mm., B from 58 to 98 mm., and C from 17 to 35 mm. To obtain comparisons, he reduces them to a percentage, always taking A = 100. In this way he found in 40 cases of ozaena simplex, aged 15 to 54 years, B = 71, C = 29, on an average, whilst in 61 healthy individuals, aged 15 to 58, there was, on an average, B = 77, C = 23, and in 88 others (either healthy or affected with other nasal affections) also B = 77, C = 23.

I have repeated the measurements in the way devised by Hopmann, and got the following results:—In 11 cases of ozaena B = 73, C = 27; in 30 cases without nasal affections B = 78, C = 22, taking the average of all the measurements.

In ozaena, therefore, the septum is, as a rule, relatively shorter, the naso-pharynx deeper than normal. This ill-development of the septum is a part of the deficient development of the rest of the nasal skeleton, and it could scarcely be understood how this could be acquired; it must, therefore, be congenital, and Hopmann adduces several reasons for this, for which we must refer to his original paper.

Together with this congenital defect in the bony structures of the nose, the mucous membrane covering the same also remains backwards in its development, thin and tender, deficient in glands, and susceptible to inflammatory and catarrhal processes.

A further proof of a congenital disposition to ozaena may be found in the fact, repeatedly observed, that ozaena is hereditary and runs in

families. Rosenfeld¹⁶ mentions the history of such a family: The mother, 65 years old, had ozæna; the son was healthy, but of his six children two had ozæna and one atrophy without ozæna; a daughter had ozæna, of her three children two had ozæna, one atrophy without ozæna; another son and his two children, ozæna; one daughter, the fourth child, healthy; the fifth, a daughter, ozæna; and a sixth, a son, atrophy without ozæna.

A series of similar cases are mentioned by Martin¹⁷.

We certainly know that not every case of abnormally wide nasal passage leads to ozæna; cases are met with, and they are not even rare, in which one finds the complete rhinoscopic picture of ozæna, *i.e.*, atrophic lower and middle turbinated bodies, dry catarrh and formation of crusts, and there is still an absence of disagreeable smell. In these cases we must assume that though there is a predisposition to ozæna, the specific germs have not taken root.

As mentioned before, a large number of rhinologists, B. Fraenkel, E. Fraenkel, Gottstein, Schaeffer, Krause, Zuckerkandl, and others consider the abnormal width of the nasal passages as a secondary symptom, caused by an atrophic process which follows a primary hypertrophic catarrh.

Schaeffer and Demme have recorded cases in which they have been able actually to observe the development of an atrophic catarrh and ozæna after a primary hypertrophic catarrh.

We must, therefore, assume that there are two modes in which ozæna may develop, namely: Firstly, in consequence of a congenital defect in the nasal structures; and secondly, in consequence of a hypertrophic catarrh leading to secondary atrophy of the turbinated bones and mucous membrane.

It was B. Fraenkel¹⁸ who explained that an abnormal width of the nasal passages leads to an insufficient clearing of the nose from its secretions, particularly when these are tenacious and dry. S. Cohen¹⁹ rightly mentions the deficiency of ciliary epithelium of the atrophied mucous membrane as a predisposing cause. But that wide nasal passages are not absolutely necessary for the development of ozæna is seen by the fact that this disease may also occur with abnormally narrow nasal cavities. Berliner²⁰ goes decidedly too far when he finds a fundamental condition for the development of ozæna in an abnormal narrowness of the nasal cavity at the height of the middle turbinated body. According to him the hypertrophied middle turbinated exerts a pressure on the septum, produces an atrophy of the mucous membrane, an occlusion of blood vessels, and a final atrophy of the lower turbinated body. Against this, Kayser²¹ remarks that cases of hypertrophy of the middle turbinated body frequently occur without ozæna, and Zucker-

kandl²² has shown that ozaena usually commences with atrophy of the lower turbinated bone. Réthi,²³ though he has seen cases of ozaena with hypertrophied middle turbinated body, has found the removal of the hypertrophied tissue inefficient in the cure of ozaena.

But it seems clear that also an obstruction in the nasal passages will lead to abolished or diminished nasal breathing, and may produce accumulation and inspissation of discharges in the nose in which again the micro-organism may find a suitable soil.

Berliner in describing a stenosis of the nasal passages as the cause of ozaena had been preceded by Sauvage and Tillot²⁴.

The minute anatomy of the mucous membrane in ozaena has been investigated by Hartmann²⁵, Gottstein²⁶, E. Fraenkel²⁷, and Krause²⁸, who made post-mortem examinations, and by Bosworth²⁹, Schuchardt³⁰, Seifert³¹, myself and others who removed pieces of the mucous membrane during life.

Krause found the epithelium frequently defective, in several places entirely absent, in others undergoing horny changes. The mucous membrane itself markedly atrophied, showing large tracts of dense connective tissue. The blood vessels obliterated or undergoing obliterating changes. The glands well preserved in a few places only, most of them distinctly infiltrated, others granular and fatty degenerated. Most remarkable, however, was the presence of an enormous infiltration of round and spindle cells, these showed an indistinct contour, and were disintegrated into a fatty detritus, which often preserved the original cell form. Besides this he found in the mucous membrane numerous large and small fat globules. This enormous fatty detritus is, according to Krause, the cause of the fœtor. The horny epithelium quickly undergoes disintegration, and changes into fatty acids, and thus produces the smell. The corroboration that this effect is due to the fat, Krause finds in the result of the microscopic examination of the crusts, which showed fatty degeneration of epithelium, accumulation of fat granules, fat globules and crystals of margaric acid.

E. Fraenkel²⁸ was not able to confirm Krause's observations in two cases of ozaena on which he made post-mortem examinations. He found the superficial epithelium partly converted into pavement epithelium, the submucous tissue infiltrated with small round cells, the vessels either normal or obliterating, the glands almost entirely disappeared, a copious infiltration of a yellow-brown pigment, but no trace of the fat-infiltration described by Krause.

Schuchardt³⁰ who examined pieces of mucous membrane, removed *intra vitam*, considers as the anatomical basis of ozaena the cirrhosis and atrophy of the mucous membrane and its epidermoidal metamorphosis.

Bosworth²² describes as characteristic (1) a diminution or atrophy of the epithelial layer, with loss of ciliæ and profuse desquamation; (2) atrophy of the adenoid layer, with obstruction of blood vessels and destruction of the acinous glands; (3) destruction of the submucous erectile tissue and its conversion into dense fibrous tissue.

Seifert²¹ gives the following results of his examination of excised pieces of mucous membrane from the middle or lower turbinated bodies. In the milder cases the cylinder epithelium showed a cellular infiltration, together with degeneration into pavement epithelium, in layers of various thickness, and keratinisation of the upper cell layers; according to the advance which the disease makes, the cylinder epithelium disappears from the surface and is replaced by pavement epithelium, the superficial layers becoming keratinised. In this way the mucous membrane assumes an epidermoidal character, which is further manifested by the formation of papilliform processes which invade the sub-epithelial tissue. A sub-epithelial cell infiltration and formation of connective tissue is present in different degrees. The glands have sometimes disappeared fully; sometimes they are present in normal numbers, but then they show considerable cell infiltration. Seifert finds the characteristics of the pathological process in the formation of pavement epithelium and its keratinisation, and the fœtor, according to him, is caused by the decomposition of the exfoliated keratinised epithelium, whilst he ascribes only a secondary importance to the micro-organisms.

The pathological process, as described by Seifert, is therefore not unlike that found by B. Fraenkel and Chiari,²² to be characteristic of pachydermia laryngis. Schmidt²³ says that he has only observed pachydermia laryngis, together with naso-pharyngitis sicca, and he considers the former as a consequence of the latter.

Réthy¹² coincides in his opinion with Krause. He found in excised pieces of mucous membrane a fatty degeneration of the glandular structures, and this fatty degeneration was only present whilst the specific smell lasted; in cases cured from the smell the fatty degeneration had disappeared. According to Réthy, it is not the alteration in the epithelium, not the atrophy of the mucous membrane, but only the fatty degeneration of the glands which is the cause of a chemically altered secretion, with the formation of fatty acids and decomposition, to which the smell is due. Réthy thinks that possibly also neuropathic or nervous changes combine to produce the smell, as it has been observed that the odour occasionally increases during menstruation or ceases during pregnancy.

I have examined pieces of mucous membrane from four cases of ozæna, and also from two cases of simple atrophic rhinitis without ozæna, in one of the latter there was a formation of crusts and scabs.

In all the four cases of ozæna the lower turbinated bodies were much atrophied; in three also the middle turbinated bodies. The disease had lasted in all the cases for years. In two of the cases the cylinder epithelium was found perfect in the removed pieces, but there was a considerable cell-infiltration in the sub-epithelial layer, and an abundance of connective tissue, the glands had disappeared in all the cases, and the vessels showed obliterating changes. In two of the cases of ozæna, the cylinder epithelium had almost entirely disappeared, and was replaced by several layers of pavement epithelium. There was no increase in fat cells or fatty degeneration perceptible in any of these cases. The changes in the cases of simple atrophic rhinitis were almost undistinguishable from those found in my ozæna patients, only that the formation of pavement epithelium and connective tissue was more sparingly present. In staining sections with osmic acid, one of the sections obtained from a case of simple atrophic rhinitis assumed a deeper colouration, showing that in this case there was some fatty degeneration, whilst none could be observed in the other cases. I can, therefore, scarcely agree with Krause and Réthi, who ascribe to the fatty degeneration such an all-important rôle. The similarity of the pathological condition in cases of atrophic rhinitis with and without ozæna shows that there must be another agent which produces the smell.

Ozæna may, of course, be complicated by scrofula, tuberculosis, and syphilis, but only the older writers thought that in every case one of these constitutional diseases formed the predisposing cause, and Warrington Howard and Spencer Watson²⁹ distinguished between syphilitic, scrofulous, traumatic, and idiopathic ozæna.

Jurasz³⁴ mentions that he has repeatedly seen cases of syphilitic ulceration of the nose with formation of crusts and scabs, but without ozænous smell, showing that ozæna is only an accidental accompaniment of syphilis.

To complete this review of the pathology of ozæna we must still mention the opinion propounded by Michel³⁵ that in all cases ozæna is due to disease of the antrum. Though Schäffer³⁶, Guye³⁷, Luc³⁸, Robertson³⁹, Gruenwald⁴⁰, Bresgen⁴¹, Réthi⁴² have observed cases in which ozæna went together with disease of the antrum, and disappeared with the successful treatment of that cavity, in the majority of cases of ozæna the antrum is found healthy. In other cases where ozæna and disease of the antrum occur together, the cure of the latter does not remove the former. In most cases of empyema of the antrum the fœtor is of a different character from that of ozæna simplex, and in the post-mortem examinations of ozæna made by Hartmann, Krause, Habermann, Fraenkel, the antrum was found healthy. Zuckerkandl (*loc. cit.*, p. 93) has shown that a similar pathological process as that

found in the mucous membrane of the nose may also affect the mucous membrane of the antrum; this has also been seen by Berger and Tyrmann⁴³, Voltolini⁴⁴, and others, and this affection may take place independently and without any disease of the nasal mucous membrane, and then we have a true ozaena of the antrum.

Jurasz⁴⁴ first drew attention to the remarkable fact that acute coryza occurs very rarely in patients affected with ozaena, and further, that when coryza does occur it frequently brings forward an improvement, and sometimes a cure of the disease.

The prognosis of ozaena is generally unfavourable. It is said that left to itself after many years the smell may disappear, and according to Morell Mackenzie⁴⁵ this takes place in the majority of cases. A large number of cases on the other hand are seen, in which the disease in spite of treatment persists for many years. The success of treatment will, of course, vary according to the extension of the pathological process; if the mucous membrane has become totally atrophied a *restitutio ad integrum* can no more be expected. The chronicity of the affection is caused by the fact that not the whole mucous membrane becomes at once affected, but that the disease gradually creeps from place to place—especially in those cases which originate with a hypertrophic catarrh.

As it is impossible to remove the anatomical basis of ozaena, the atrophy of the turbinated bones, impossible also to remove the atrophy of the mucous membrane, when once this has progressed to any degree, the indications which a treatment has to fulfil will be firstly to remove the crusts, and with these the most troublesome symptom, the fœtor, and secondly, to prevent, if possible, the formation of fresh crusts.

In the treatment of nasal affections, it is, above all, necessary to clear the nose. The natural process for clearing this organ consists in blowing it, but to remove mucus from the lower nasal passage, the ordinary mode of blowing the nose is insufficient; it becomes more effective when one side of the nose is occluded whilst the patient blows through the other.

For the removal of the crusts, various antiseptic solutions are employed in the form of nasal sprays, lotions, and douches. In using these it will be first of all advisable to apply them as warm as possible, as Loewenberg has shown that the ozaena coccus is killed by a temperature of 125° F. Injections at this temperature can well be borne when the temperature is gradually raised to this degree. In employing nasal injections, the pressure should never be too great, as otherwise the fluid might penetrate into the Eustachian tubes, and set up otitis media. If an irrigator is used, the vessel should not be held more than 12 inches above the head of the patient, but it is safer to use a syringe. The

nasal piece of many nasal douches and syringes, as usually sold, is too thick; it should not quite fill up the nasal opening, but allow some of the fluid to flow out at the side. The nasal piece of the syringe should be held almost horizontally, and the head of the patient should not be bent too far forward, as otherwise the fluid penetrates into the upper parts of the nasal cavity and causes pain. To clear the upper parts of the nose it is always better to use a spray, or small cotton-wool plugs affixed to a probe, the pledgets being moistened with carbolic oil or cresolidide oil (3 per cent solution). For this purpose probes are used, roughened or made into a coarse screw at their ends. Some cotton wool is at first firmly, then more loosely, wound round them, and their use will be found preferable to the camel hair brush.

As a lotion for the purpose of cleaning and disinfecting the nose simple hot water may be employed, or a solution of potassium permanganate (one teaspoonful of a 2 per cent solution to a quart of water), or of soda or zinc sozoidol in 1 per cent solution, or aluminium aceto-tartaricum in 20 per cent solution (one teaspoonful to a quart of water), as recommended by Schaeffer (*loc. cit.*), Schech,⁴⁰ and McBride.⁴¹ These injections have, at first, to be made two or three times a day, later on—after months—one injection daily might be sufficient; but to produce any more permanent results they have to be continued for a year or two, and even then the smell is found often to return as soon as the injections are given up.

I therefore at once combine the use of the injections with the treatment first advocated by Gottstein³⁸ in 1878. This treatment formed a real advance in the therapeutic measures hitherto advocated for ozena. It consists in the introduction of cotton-wool plugs into the nares by means of a probe with a coarse screw end. In wider noses plugs as thick and as long as the little finger may be introduced. The cotton-wool should be wound loosely round the probe and introduced obliquely upwards and backwards, turning the probe to the right; then, when the plug is well in the nasal cavity the probe is turned slowly to the left, and so screwed out of the plug and withdrawn. The cotton-wool tampon is left in for an hour or two, when it becomes saturated with nasal secretion, and by blowing the nose is easily expelled, together with any crusts which have remained behind. It is found that these plugs promote a secretion of fluid mucus, that the smell is at once diminished, and that the formation of the crusts and fœtor ceases for several hours after. Both nares should be treated in this way alternately. E. Fraenkel (*loc. cit.*, p. 287) has shown that plugs of lint, etc., do not act in the same favourable manner.

By these means, and the prolonged use of these applications, more or less permanent improvement and sometimes even a cure has been

observed. Should the tamponnade of Gottstein not succeed at first it shows that the pledget of wool is not large enough ; it is necessary that it should be in thorough apposition to the mucous membrane. These plugs may also be moistened with cresol, carbolic oil, or peruvian balsam, but these applications, though recommended by some rhinologists, do not seem to have any special advantage. Woakes⁴⁴ found medicated wools more effectual ; these are impregnated with various drugs, as tannic acid, alum, hamamelis, boracic acid, iodoform, etc.

The application of powders, astringent, disinfectant or irritant, cannot be recommended, as they mostly increase the formation of crusts.

At the Berlin International Medical Congress, Michele-Braun⁴⁵ demonstrated a new way of treating ozaena by vibratory massage, and he has since then reported a number of successful cases. Laker, Demme, and Schmidt also report favourably on this treatment. For this manipulation a probe is surrounded by a small and firm cotton-wool plug. This is dipped into a ten per cent cocaine solution, or in iodoglycerin, or in a ten per cent Europhene-lanoline ointment, and the diseased mucous membrane is touched in all its parts, whilst the probe is strongly and very quickly vibrated. These vibrations are most difficult to execute, their quickness is said to be very essential. Braun makes 200 or more vibrations in the minute. To produce this speed the arm of the operator is to be held in "tetanic contraction," and the vibratory movements are made from the wrist-joint. Storch, of Copenhagen, and Braunschweig of Frankfurt, have constructed special apparatus for this treatment, which do away with the irksomeness of these applications, which have to be made daily for two to three minutes.

In cases not too far advanced, a quicker result may frequently be obtained by the application of caustics to the diseased parts. For this purpose trichloroacetic acid may be recommended. It is applied either by dipping a heated probe into the acid and melting some of the acid on to the probe, or by adding a little water to the acid and applying it with cotton wool on a probe.

More effectual yet, and the most successful in early cases—cures by this method having been recorded by B. Fraenkel, Morell Mackenzie, Watson, Schmidt, Réthi, Demme, and myself⁴⁶—is the treatment by galvano-cautery. The galvano-cautery should be differently applied over places of mucous membrane already entirely atrophied, differently over places only slightly affected. Over the latter the galvano-cautery should only be applied superficially, but if the membrane is entirely atrophied the cautery should be applied deeply and thoroughly. Before applying the galvano-cautery, of course all crusts and scabs should be thoroughly removed, and the mucous membrane cocaineised. After the application of the cautery, I apply, according to Bressgen, some

pyoctanine, and plug the operated side of the nose with boric acid cotton wool. If the reaction should be great, and much swelling take place, I order a spray of boric acid, 5 gra., cocain hydrochlor., 5 gra. to 1 oz. of water; about 1 drachm to be used each time thrice daily. In making the deeper applications, the galvano-cautery should only be red-hot, as otherwise troublesome hæmorrhage may follow.

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ON THE TREATMENT OF SYPHILIS.

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(Continued from page 178).

THE two opposing methods adopted in the general treatment of the earlier stages of syphilis (omitting the purely expectant or nihilistic), namely, the chronic intermittent and the purely symptomatic, must, until we know and can detect the presence of the actual cause of the disease, be regarded merely as working hypotheses. Both have, therefore, to appeal to experience for their justification, and the results of this experience, as we have seen, are apparently very conflicting.

Thus, Kaposi (1894), writing on the length of time for which anti-syphilitic treatment should be carried on, vigorously opposes, as he has always done, the "*Méthode des traitements successifs*." He describes this method in its entirety as being neither on a satisfactory theoretical foundation nor substantiated by its results; indeed, he considers it for most cases unnecessary, troublesome, and sometimes actually injurious. Later on he admits that, to a certain degree, it is logical and true, but complains that it leads inevitably to a continual treatment with mercury and iodine, the very abuse against which he is specially polemising. His method is to inaugurate the treatment as soon as the symptoms show themselves indubitably, and to continue it until they disappear; as soon as a relapse occurs it must be recommenced, although even then purely local applications are often quite sufficient. It is not injurious to subject the patient to the general treatment in exceptional cases, *e.g.*, before marriage, even if he be at the time free from any actual signs of the disease, but it is not justifiable when there are no symptoms of active syphilis present, to go on treating the disease continuously after a set pattern. Continuous treatment is, moreover, unnecessary, since most syphilitics remain permanently well after one or two periods of treatment, and it is to be deprecated not only on physical, but also on moral grounds. The first treatment ought to be of long duration and very carefully carried out, but should never be repeated unless characteristic syphilitic phenomena are manifested. The prognosis of syphilis is, on the whole, favourable, but the phthisical and alcoholic, and those who have not been treated methodically from the commencement, give a much worse prognosis. The influence of the abortive or preventive treatment is, to his idea, just as prejudicial.

Von Watraszewski (Warsaw) has also tried to prove that bouts of mercurial treatment (*Merkurialkuren*) instituted periodically, when no symptoms of syphilis are present, are unable, either in the earlier or later stages of the disease, to put a stop to further manifestations of the disease. On the contrary, he believes that such treatments, undertaken at unsuitable times and periodically repeated, ought to be reckoned amongst the forms of irritation which can bring about relapses of an old, latent, apparently healed syphilis. He has seen cases which had for years shown no specific symptoms break down after a mercurial treatment with development of tertiary symptoms, and especially of those affecting the nervous system. Indeed it is particularly the nervous system, which, under a protracted and repeated mercurialisation, not unfrequently loses its normal ability of resistance, and furnishes a favourable ground for the development of syphilitic processes. He does not wish in the least to banish mercury from the treatment of syphilis, but to limit its use to those times at which actual specific phenomena of

the disease are present. V. Watraszewski does not inform us in what way his mercurial treatment was administered, and what amount of mercury was therefore absorbed, although, in order to bring about such disasters, the quantity must have presumably been fairly large ; and, as Berliner (Aachen) points out, it is precisely in those cases in which the secondary symptoms are rapidly removed by a course of mercury, even a single course, and in which, owing to the non-appearance of further symptoms, no more mercury is given, that the majority of the tertiary symptoms are found. It does not seem to have occurred to the supporters of this merely symptomatic form of treatment that the results arising from the methodical non-administration of mercury are generally worse than those due to its methodical administration, which they so vigorously denounce.

Professor Kaposi is no doubt quite right in stating that in the absence of some definite plan of defining the duration of time for which mercury must be administered, there is no reason to prevent its continuous use. But the objection to its continuous, as to its early, administration, seems to depend very largely on the manner in which it is employed, and on the amount which is, therefore, incorporated in a certain time. If it is employed in the form of inunctions, or of injections of the pure metal (in the form of *Oleum Cinereum*), as it is in Vienna, or of insoluble mercurial salts, it is obvious that it is impossible to continue such a treatment for a long period, since it has been shown that so large a quantity is incorporated into the system that it is usually some three or four months, at the least, before the last traces are eliminated in the excretions. If, however, it is introduced for long periods in minute doses this accumulation does not occur, a fact which has been actually used to show the futility of administering mercury in this way. But to return to the criterion of clinical experience, it is the emphatic opinion of many, and myself among others, that when mercury is given in small and continuous doses for months together, it has, so far from being useless or prejudicial, in the great majority of cases a most satisfactory action in combating and destroying the syphilitic virus, and that it does not in any way influence the organism of the patient prejudicially. If given in this way, the earlier it is commenced the better after the diagnosis has been made with certainty, and if any symptoms should arise with which it is not strong enough to cope, an addition to the dose, whether made internally or externally, is found to have the desired effect in abating the vigour of the disease, and just as satisfactorily as if the remedy were being administered for the first time. That is to say, the body does not become so blunted to the action of mercury by the long-continued administration of small doses that it is impossible to get a sufficient effect from increased doses when their help

is required, an assertion which has long served as a favourite argument with the upholders of the purely opportunist method.

I have said before that in my experience, and in that of others, the long-continued use of small doses of mercury has no detrimental influence on the bodily health of the patient, and that experience holds equally good with regard to the mental influence of a prolonged treatment, which Professor Kaposi considers to be so undesirable. Hospital patients are notoriously careless as to the treatment of their syphilitic attacks, and almost invariably, however emphatically they may be warned, cease their attendance as soon as the most unsightly or troublesome symptoms have disappeared; but with private patients, who have often generally a fairly clear and often exaggerated idea of many of the possible evils which the disease may bring with it in the immediate or remote future, the case is very different. In the former case the patients are content to await whatever turns up in their usual casual, hand-to-mouth style; whilst the latter, being more used to look forward into the future and provide for possible contingencies, are in a fever of anxiety if nothing is being done to counteract the possible, though unseen, progress of the malady. In both these classes of patients the continuous method is of distinct advantage from the point of moral control; for to the careless it acts as a disciplinary measure, reminding them that they are still invalids, and must continue to pay careful attention to the various hygienic and dietetic restrictions which have been imposed upon them, whilst to the latter it serves as an invaluable mental sedative by relieving them from their syphilophobic fancies, which are often far more detrimental to their well-being than the disease itself. Both methods, the purely symptomatic and the continuous, are undoubtedly capable of giving excellent results; but with the patients with whom we have to deal in this country, and the type of the disease with which we ordinarily meet, I have no hesitation, after trying both, in saying that the balance is distinctly in favour of the long-continued and milder form of treatment.

Yet none of the forms of treatment which have been so far devised, whatever materials have been made use of, and in whatever way they have been employed, can be called by any means perfect. To speak of mercury and iodine as merely palliatives, as some writers have done, is to belittle them most undeservedly; for numberless cases have been restored to lifelong freedom from all manifestations of syphilis by their intervention. But infallible they certainly are not. Dr. Collins (New York), in a recent article on "The Affections of the Nervous System in Early and Late Syphilis," quotes the optimistic assertion of Fox and others, mentioned above, that "if properly treated, syphilis is one of the most eminently curable diseases," against the pessimistic statements of

Gowers, who says, "Make what deductions you can for the mild and latent forms of the disease, recognise all our powers of repression, and the fact still remains that we have yet to find the means of arresting it." And again: "There is no real evidence to show that the disease ever is or ever has been cured." And although he considers that both these views are very extreme, he inclines, as a neurologist, to Gowers' dogma as being "much less baneful in its teachings than the one which asks us to believe that syphilis is not only a benign, but a much-maligned disease." The difference obviously arises from the difference of the point of view; for whereas the surgeon and dermatologist see numerous cases freed from the outward signs of the disease, and apparently restored to perfect health, the neurologist comes only into contact with the manifestations which often arise insidiously years after, such as neurasthenia, neuralgia, spasms, paralyses, eye disease, anæsthesias, and the like, and with those hopeless forms of gross nervous lesions, classed as "parasyphilitic" phenomena by Fournier. These affections do not, it is true, owe their origin to the action of the syphilitic virus alone, but to that in combination with such degenerative factors as alcohol, excesses of sexuality, and all those tendencies, hereditary and acquired, which go to make up what is known as the "neurotic diathesis." When these factors, sufficiently disastrous in themselves, unite their forces with that of syphilis, or are brought to bear upon tissues previously weakened by the action of the syphilitic poison, a train of evils arise which are seldom found in those whose syphilis has been well treated from the outset, and who have otherwise led a healthy life, and have been exposed neither to overstrain of mind or body nor to want and misery. Trauma is to be placed in the same category as excesses; for if the trauma be not sufficiently severe to produce apparent injury, it seems to act quite as do excesses.

Extensive statistics, made by many capable observers, show that from 5 to 20 per cent of all patients who have been affected with syphilis develop at some time some form or other of tertiary lesions. The lower of these numbers refers to patients treated privately, and the higher to those treated in hospitals during the secondary stage. The skin is the organ by far the most frequently attacked, but both Fournier and Haslund agree that the nerve cases constitute about one-third of the whole. Amongst the private patients, therefore, the number who suffer from tertiary nerve affections is not more than 2 or 3 per cent, and as this is the class of patients who live under the most favourable hygienic conditions and take the greatest care with their treatment from the time of their infection onward, Collins is fully substantiated when (in agreement with many eminent syphilographers), he makes the statement that "probably the most serious element in the occurrence of

nervous syphilis is the lack of early, vigorous, and continuous treatment, dating from the first constitutional manifestations." That this holds true of the tertiary affections of the skin is undisputed.

As to the best means and methods of carrying out this treatment, apart from the details of the administration of mercury and iodine, speculation has long been rife. The proposal made by Diday, in 1849, to introduce an artificial protective "syphilisation" by the repeated inoculation of the secretion of soft sores, was based on the confusion which then existed as to the unity of the virus of the soft or venereal sore and that of the hard chancre. It received a severe shock when it was proved that the presence of pus was necessary for the success of the inoculation, and that its introduction was not followed by the appearance of secondary symptoms. And when it was found that even the secretion of definite syphilitic lesions was not inoculable on syphilitics, unless they had been previously excited to suppuration by the action of such irritants as savine, the whole project fell through.

During recent years, under the influence of the more or less successful results which have been obtained in preventing the development of disease by the inoculation of the virus in an artificially modified or weakened form, various proposals have been made both for the prophylactic treatment of syphilis and for the actual treatment of the disease itself by the injection of a modified syphilitic serum, or of a serum which was supposed to be antagonistic to the syphilitic poison. As Mauriac has pointed out, the immunisation of the mother by the syphilitic foetus (or of the foetus by a mother syphilised after conception), which is a kind of protective inoculation, suggests a hope that such a process is possible. But, so long as the virus is unknown, and is not transmissible to animals, the idea must, he thinks, remain a dream; and even if possible it would remain questionable as to how far it could be employed, for an inoculation with a weakened virus might be by no means an indifferent procedure, and one which might involve the operator in serious responsibility.

Apart from this proposal to use serum as a preventive inoculation against syphilis, several attempts have been made to employ it in the actual treatment of the active disease. It occurred to Tommasoli, of Modena (1891), that the immunity which the lower animals enjoyed in regard to the syphilitic poison might perhaps be transferred to man by inoculating him with their serum, and that the serum thus introduced might serve either as a direct or indirect poison to the disease. With this view he injected the serum obtained, either by coagulation on ice or by centrifugation, from the fresh blood of lambs and calves. From 2 cm. to 8 cm. were injected with the usual antiseptic precautions into the buttocks, and as many as fourteen injections were made into a single

individual. In his later experiments he added sublimate in order to sterilise the serum more quickly. But although he found that the injections had an apparent effect in causing the symptoms to disappear, he had to allow (1894) that several of his cases had relapsed.

Istamanoff repeated Tommasoli's experiments on 16 patients, and found that the secondary symptoms disappeared in 15 cases; but in one they soon recurred, in one all vanished except an ulcerated papule which had to be treated with calomel, and in one case there was no result whatever. His observations were of too short a duration to allow him to draw any definite conclusions as to the ultimate value of the method, but he states that the injections were very painful, and that they always raised the temperature, though not to a dangerous degree.

In spite of the ingenuity of the idea no one except the originator has yet spoken well of its results, and it has found several vigorous opponents in Italy. In France, Fournier has tried the effect of injections of the serum of dogs and horses, and Feulard has experimented with the serum of dogs; no lasting advantage, however, seems to have been gained, for no further experiments with the method have been published of late. Pellizzari has opposed the whole principle of this "Hæmotherapy," on the ground that the immunity of animals to syphilis does not depend on the properties of the blood, but of the tissues. Since, however, his uncle, Pietro Pellizzari, had shown that the blood of syphilitics was infectious, there certainly does seem to have been a probable basis of fact for Tommasoli's supposition.

Celso Pellizzari has himself attempted a serum treatment of syphilis, but one based on entirely different principles. In his view the virulent agent in syphilis must be fought by means of the chemical substances which it itself produces, and with this idea he inoculated into patients suffering from syphilis blood serum which he had obtained from other syphilitics in various stages of the malady, *i.e.*, in the commencement, in the transition period, and in the gummatous stage. More recently he has used the serum derived from patients who had undergone a thorough treatment with mercury and iodine, in order thus to procure a serum which had been artificially weakened, and he claims that his injections made with this fluid gave very encouraging results. It remains, nevertheless, a question whether this is justifiable, unless, like transfusion of blood, it is a voluntary sacrifice on the part of the blood-giver. For, on his own showing, he is robbing one patient of his antitoxine in order to give it to another.

Bonaduce (1892) was induced to attempt the preparation of another curative serum through a study of the process of natural immunisation of the mother by the syphilitic fœtus. The placenta is known to act as a filter through which the active, presumably solid, elements of the

poisons of several diseases are unable to pass, and as the mother is not infected with primary or secondary symptoms when carrying a syphilitic child (unless through some accidental hæmorrhage there be direct contamination, as, *e.g.*, by a rupture of the placenta) she is presumably inoculated gradually by a constant transmission of minute quantities of the serum of the fœtus which has been exposed to the prolonged action of the virus. As the kidneys form the channel by which most of these poisons are filtered off from the organism (Bouchard), and as these glands do not act during foetal life, it is evident that the poison and the immunising fluid have no outlet, and must, therefore, in all probability, be contained in the child at birth. He therefore took blood from three children who were born with obvious symptoms of hereditary syphilis, and obtained the serum from it by coagulation on ice. It has been found that in the serum thus obtained in several other infective diseases there is not only an antitoxine, but a distinct toxine also present, but that the toxine can be destroyed and precipitated by adding sterilised water and warming the solution. Having done this, he obtained a sterile serum preparation which might contain the antitoxine in sufficient quantities for therapeutic purposes. His experience of its action appears to have been limited to one case, that of a man with a recent hard chancre, into whom (with his consent), he injected 10 ccm. of the fluid every other day for twenty-four days. The sore quickly healed without any local treatment, and the glandular swellings were soon reduced. A very thorough examination made seven months afterwards failed to reveal the slightest signs of the disease.

T. Broes van Dort records that he treated a precisely similar case by the same method, and with almost identical results; the sore healed in thirty-five days, and within that time there had been a marked diminution in the size of the swollen glands, and a year later no further lesions had shown themselves.

The whole procedure evinces great ingenuity, but unless it can be proved that the toxine, which to judge by analogy is present in the serum as well as the antitoxine, is completely removed by the heating and dilution, it is plain that the injections might have distinctly dangerous consequences. And even though Bonaduce's suggestion were adopted of obtaining the serum from the placentæ of women who had given birth to syphilitic children instead of from the children themselves, there might still be some difficulty in obtaining an adequate supply of reliable fluid.

(To be continued.)

Clinic.

CASE OF ANEURISM OF THE LEFT AURICLE.

Under the care of Dr. J. DRESCHFELD,
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Manchester.

M. S., widow, æt. 58, was admitted into the Manchester Infirmary, on Nov. 29, 1894, suffering from œdema of the lower extremities, dyspnoea, and general weakness. When about fourteen years of age was troubled with rheumatism, and spent many days in bed. She recovered from this and enjoyed good health for many years. She married at the age of 19, and had nine living children, one miscarriage, and one still-born child. During the last four years she has been troubled with cough and difficulty of breathing on exertion; during the last year she felt weaker and had an attack of syncope. A month before admission she noticed swelling of her feet, the dyspnoea became more marked, the cough more troublesome, and accompanied occasionally by sanguinolent expectoration. She was able to follow her household work till a few weeks before admission. She lived at first at Preston, and latterly at Blackpool; she had not to do any heavy work, has always had a plentiful supply of food, and has only rarely taken any alcoholic stimulant.

Condition on Admission.—Patient lies propped up in bed, is much emaciated; face and extremities are somewhat cyanotic; external jugular vein much distended and seen distinctly pulsating. The feet and legs are slightly œdematous. The chest is well formed, the cardiac area shows no bulging; the apex beat is diffuse, weak, and felt in the sixth intercostal space in the anterior axillary line, about an inch to the left of the nipple line; there is also some epigastric pulsation. Pulsation is also seen to the right of the sternum in the fourth and fifth intercostal spaces.

On palpation, the apex beat is felt weak; to the right of the sternum, over the pulsating area, a distinct systolic thrill is felt; percussion shows the area of cardiac dulness very much increased; dulness commences at the third left costal cartilage; it extends latterly in the fourth and fifth intercostal spaces to about two inches to the right of the sternum, and on the left side the dulness extends in a slanting direction from the left third intercostal cartilage to the sixth intercostal space in the anterior axillary line where the apex beat is felt. On auscultation, a systolic and diastolic murmur is heard at the apex, not propagated to the axilla and not heard at the back; over the pulsating portion to the right of the

sternum a distinct systolic bruit is heard ; over the aorta a very faint diastolic bruit is heard ; the second pulmonary is accentuated ; the pulse at the wrist is so small as to be only faintly perceptible—72 per minute.

The examination of the lungs shows extensive bronchitis, respiration 26 per minute, laboured. The liver appears not enlarged, the spleen as slightly enlarged. The urine has sp. gr. 1015 ; contains a small amount of albumen, and a few granular casts.

The diagnosis made was : Mitral stenosis and aortic regurgitation.

The patient's condition remained unaltered during the short stay in the hospital ; she was unable to take much food, had very restless nights, which were only slightly relieved by morphia.

On December 9 she had an attack of syncope, which lasted some time ; she felt very exhausted ; the pulse now became quite imperceptible, and on December 11 she died quite suddenly.

ABSTRACT OF DR. KELYNACK'S REPORT.*

A post-mortem examination was made on December 13. The body was that of a short elderly female. Face and neck congested. Edema of lower extremities. Well-marked corneo-scleral degeneration circle. Jaw of senile type. General wasting.

Heart : Enlarged and somewhat prominent as it lies *in situ*. Right auricle : dilated and walls thickened ; projecting into posterior and inner walls is large tumour-like mass, which, on being opened, is found to contain laminated blood-clot. The aneurism wall at this point is very thin, being formed only by thickened auricular wall and adherent fibrin. Tricuspid orifice slightly dilated. Right ventricle dilated and hypertrophied. Pulmonary orifice and valves normal. Left auricle is the seat of large aneurism, which is of the size of closed fist. The sac extends from inner and posterior wall backwards, downwards, and to the right behind the pulmonary artery and aorta, and bulges into right auricle and upper part of pericardial cavity. The sac contains layers of fibrin and blood clot. The aneurism does not project forward, and is only noticeable on turning the heart upward, or by entering the right auricle. The walls of the auricle are much thickened, and present irregular areas of calcification. Mitral orifice extremely stenosed, admitting merely the tip of the fore-finger. The valve segments are much sclerosed, and in great part calcified. The chordæ tendinæ are also extensively indurated, and the upper part of the muscoli papillares are also sclerosed. Left ventricle dilated, but with little or no hypertrophy. Aortic orifice : Valve segments extremely indurative, and much contracted and deformed, and deficient in mobility ; there is a fringe of recent vegetation. Aorta : Few patches of early atheroma. Pericardium : Aneurism bulges into

* "Manchester Royal Infirmary Post-mortem Reports : Medical," Vol. 1894, p. 475.

cavity at its upper and posterior part. Lungs: Congested, œdematous, pulmonary hæmorrhages, with pneumonia at right base; much bronchitis and peribronchial fibrosis. Pleuræ: Old adhesive pleurisy. Peritoneum: Slight ascites. Gastro-intestinal tract: Congested. Liver: Small, weight 32oz., capsule thickened, evidence of diffuse cirrhosis; slight "nutmeg" condition; gall bladder contains calculi. Spleen: Enlarged, weight 7½oz., congested. Kidneys: United weight 7½oz., typically "cirrhotic." Ureters and bladder: normal. Genitals: Senile characters. Brain: Congested, but otherwise presents no gross lesion.

Remarks.—Aneurismal dilatations of the cavities are exceedingly rare; the best known and most frequently occurring are those of the left ventricle (see Wickham Legg, Bradshaw Lecture, *Medical Times and Gazette*, 1883, Vol. II., p. 199), and mostly the result of fibrous myocarditis. Aneurism of the auricles are still rarer, and only a few have been recorded (see Pathological Transactions), and those appearances which have been called by this name are usually simple dilatations of the auricle, secondary to mitral stenosis. A glance at the description of the aneurism in the above case will show at once that we had here to do with a large sacciform dilatation, corresponding in every way to a true aneurism; the mass projected backwards and to the right, compressing the right ventricle; its walls were very much thickened, and consisted chiefly of firm fibrous tissue, with irregular areas of calcification; its contents consisted of laminated fibrine lining the wall, and coagula. As to its probable causation, we can only surmise that it was probably due to a slight rupture in the myocardium of the auricle, which, considering that the mitral stenosis was of many years standing, and very extensive, was exposed to considerable pressure. It is not probable that fibroid changes were the cause, and certainly abscess and hydatid cyst could be excluded. Of the symptoms observed during life, the pulsation noticed to the right of the sternum was due to the displaced and compressed right ventricle; the auscultatory signs can well be explained by the condition of the mitral and aortic valves, and the feeble, towards the last two days' imperceptible, pulse, and the attack of syncope, were probably the result of the small amount of blood which passed from the left auricle into the ventricles. Both as regards size, saccular formation, and situation, this aneurism appears to be unique, as far as I could learn from the records of previously recorded cases.

CHRONICLE.

Medicine.

UNDER THE CHARGE OF JULIUS DRESCHFELD, M.D., F.R.C.P.

STARR (ALLEN). "A contribution to the subject of tumours of the spinal cord, with remarks upon their diagnosis and their surgical treatment, with a report of six cases, in three of which the tumour was removed."—*The American Journal of the Medical Sciences*, June, 1895.

IN this paper the author reviews the symptoms presented by 123 cases, which he has collected from the medical literature of the last twelve years, and adds six personal observations of cases of spinal tumour.

Case 1.—Carcinoma of the cervical region of the cord, secondary to carcinoma of the pancreas.

Case 2.—Gumma of the lower cervical cord: recovery under treatment.

Case 3.—Sarcoma of the spinal cord in the dorsal region; removal; death.

Case 4.—Tumour beginning in the lumbar region, and involving the sacral region and cauda equina.

Case 5.—Lipoma of the lumbar region of the cord; operation; removal; caries of the dorsal region; death.

Case 6.—Tubercular tumour of the spinal cord; removal; partial recovery; recurrence.

Diagnosis.—From the study of these cases, and of cases collected from medical literature, Starr draws the following conclusion with regard to diagnosis. The most important and earliest symptom of tumour of the spinal cord is *pain*, which is usually located in the peripheral termination of the nerve root which is first compressed by the growth of the tumour. In most cases pain is referred to the epigastrium or abdominal region, or to the legs or arms, rather than to the spine. The majority of the tumours of the spinal cord occur in the dorsal region, hence pain about the trunk is of great importance. Such pain at first is unilateral, but soon becomes bilateral; it is rarely, if ever,

limited to one side of the body in the stage when paralysis has developed, a point which the author believes to be of importance in diagnosis. Pain is not felt, as a rule, in the spine itself, unless the tumour has grown to a sufficient size to produce pressure upon the dura mater and vertebræ. Even when there is no pain in the spine, it is not uncommon to find some tenderness upon pressure, or tenderness upon percussion. The author states, that there appears to be no case of spinal tumour on record in which there was tenderness along the nerves in which the pain was felt. This he regards as a point of importance in the differential diagnosis between the pain of neuralgia or neuritis, and that of tumour of the spinal cord. Movements of the limbs, or of the body during respiration will usually increase the pain in neuralgia or neuritis, while in spinal tumour, if the pain is produced by any movement, it is a movement which involves flexion or rotation of the vertebræ.

In ordinary myelitis uncomplicated by meningitis pain is not a symptom; whilst in meningitis or in myelitis with meningitis the pain is very extensive in distribution, is not limited to a small region as in spinal tumour, and is attended by hyperæsthesia.

The second group of symptoms of diagnostic importance are those produced by compression of the cord by the tumour. These symptoms appear in a certain order:—(1) Pain referred to the periphery; (2) increase of reflex activity below the point of compression; (3) paralysis; (4) loss of sensibility; (5) loss of reflex activity. In the majority of the cases collected by Starr this has been the order in which the symptoms were produced. In a very few cases, the tumour being situated entirely upon one side of the cord, the symptoms produced have been those of typical Brown-Séquard paralysis—viz., hyperæsthesia, with paralysis on the side of the tumour, and paræsthesia, followed by anæsthesia on the side opposite the tumour. The infrequency of Brown-Séquard's paralysis in spinal tumour is probably because the pressure exerted upon the cord, though it begins upon one side, is communicated to the entire segment involved, and hence a definite suspension of activity in one half of the cord only is not common. The development of Brown-Séquard paralysis is more frequent in intra-spinal than in extra-spinal or in extra-dural tumour.

A paraplegia, advancing with greater or less rapidity, is usual in most cases of spinal tumour. There is a sensation of weakness, followed by actual paresis, and finally by total paralysis in the legs. In the early stage the knee-jerks are increased and ankleclonus is present. Priapism is common. A spastic condition of the legs and bladder and rectal symptoms develop. Bedsores and cystitis only occur in the last stages of the disease; these symptoms occur earlier and more frequently in intra-spinal than in extra-spinal tumours: they are not uncommonly

observed early in cases of myelitis, especially of the lumbar region ; and the author thinks this point may be of importance in the diagnosis.

The author refers to the distribution of the sensory nerves with regard to localisation of the tumour growths. He points out that the location of any tumour in the cord is usually at a point two or three inches higher than the line of anæsthesia, when that line of anæsthesia extends round the body in the dorsal region. Starr regards the combination of the above-mentioned symptoms—pain of the peculiar character described and progressive paraplegia with the characteristic order in the development of symptoms named—as absolutely diagnostic of spinal cord tumours. The dorsal region is the most common seat of a new growth, and hence this fact is of some importance along with other symptoms.

Treatment.—The author has collected from medical literature the records of 22 cases in which the spinal tumour has been localised and removed. Very brief details are given of each case in Starr's paper. The patient recovered from the paraplegia in six cases (in one of these the compression was exerted upon the cauda equina and not upon the cord). It is necessary to remember, however, that in many cases an operation was only undertaken some months after the onset of the symptoms, *i.e.*, at a time when there were marked secondary changes in the spinal cord. In several of the cases which have been examined post mortem, there has been softening of the cord in the region of the growth. Another point of importance with regard to the prognosis is the nature of the growth. The most frequent spinal tumour is sarcoma, next in frequency comes tubercle, and lastly benign tumours. In the cases that have recovered, the nature of the tumour has been of a benign type—fibroma, lipoma, and connective tissue tumours. The development of the symptoms appears to be more rapid in the case of malignant tumours than in the case of benign tumours, and this fact, the author thinks, may be of service in deciding the prognosis before the operation.

Tumours which lie within the spinal cord itself, developing in the grey matter, are certainly incapable of removal. It is, therefore, only in extra-spinal tumours, either intra-dural or extra-dural, that an operation can be performed.

The differential diagnosis between intra-spinal and extra-spinal tumour is difficult—in some cases impossible ; and hence an operation must always be considered as in one sense exploratory. The chief points in favour of an intra-spinal tumour are—the development of Brown-Séquard paralysis prior to the development of paraplegia, the early occurrence of marked atrophy, and the reaction of degeneration in the muscles ; the early occurrence of trophic disturbance and of bed-sores and the development of analgesia prior to anæsthesia.

In spite of the unfavourable results in many cases, it is to be remembered that the disease is of a hopeless character, and the termination fatal, without operative interference. Early diagnosis is of the greatest importance. As regards the operation itself, Starr draws attention to the following points:—

(1) The necessity of a large incision of considerable length, in order that the muscles may be easily pulled aside, and held by retractors, while the bones are being cut through, because the depth of the wound is so great that plenty of space is required.

(2) The liability of very large hæmorrhage from the muscular arteries of the back, which is best arrested by packing the wound with gauze, and by pressure exerted upon the gauze by means of broad retractors. If time is expended in tying these numerous arteries, the operation is much delayed, and pressure is sufficient to arrest the hæmorrhage in the majority of cases, especially when it is kept up for one half-hour, the time usually occupied in completing the operation.

(3) It is best to remove the spines of the vertebra with sharp-cutting forceps, and, when a moderately fair surface of bone is thus attained, to go through to the canal, either by chiselling or by means of gnawing with a sharp rongeur. The surface is not sufficiently flat to accommodate easily a trephine, and the former method is more rapid.

(4) The dura should not be opened until the entire extent which it is proposed to lay bare has been attained, and until the wound is practically clear of blood. "Usually a tumour can be felt and seen through the dura, but if not felt no hesitation should be made in opening the dura. When the dura is opened a gush of cerebro-spinal fluid is inevitable, and when this occurs a change in the rapidity of pulse and respiration ensues." Hence the author thinks that "the incision in the dura should be made very slowly—a rather small puncture at first—so that the removal of this cerebro-spinal fluid shall occur slowly." "Great care should be taken not to rupture, cut, or tear any vessels of the pia mater, for this hæmorrhage is very difficult to arrest, inasmuch as these vessels are too delicate to tie, and compression is impossible." In removing the tumour, division of the posterior nerve-roots should be avoided if possible, especially in the cervical and lumbar region, and about the cauda equina.

(5) Should the tumour extend around the spinal cord, great care should be taken in pulling the cord aside in order to get at the anterior surface, for slight compression of the cord is sufficient to produce much destruction of its elements, or laceration of the nerve-roots.

GOWERS (W. R.). "On severe optic neuritis."—*Clinical Journal*, June 5, 1895.

THIS paper is the report of a clinical lecture given by Dr. Gowers, at the National Hospital, Queen's Square, on an interesting case presenting symptoms of intracranial tumour. The chief symptoms were—headache, which rapidly became severe, transient paresis of the left internal rectus, and intense optic neuritis. The pain in the head became paroxysmal, and was more severe in the left occipital region. Dr. Gowers points out that the optic neuritis (which is occasionally, but very rarely) met with in anæmia, may be associated with severe headache, but this is general or is greatest in the front of the head. It is also more or less constant—not paroxysmal. Then there are also conspicuous signs of anæmia. The importance of rest and the administration of iron in these rare cases of the optic neuritis of anæmia is pointed out, and a note of warning is added against the administration of potassium iodide in such cases, when syphilis can be excluded.

Two diagrams are given, showing the intense optic neuritis in the case which was the subject of the lecture. There were marked retinal changes (white patches resembling those of albuminuric retinitis) in both eyes, but these were most marked in the right eye.

The risk of mistaking the albuminuric retinitis (in which there are well-marked changes in the optic discs) with the optic neuritis of cerebral tumour is pointed out. This risk is especially great in certain cases in which Bright's disease gives rise to optic neuritis with only very slight changes, or with no changes whatever, in the retina.

The question of the relation of optic neuritis to increased intracranial pressure, and the subsidence of neuritis after trephining alone, are referred to. [See abstract of paper by Taylor, *MEDICAL CHRONICLE*, May, 1895, p. 121.]

In the case which Dr. Gowers records, the optic neuritis subsided at a later date. The headache diminished, then increased. There was also retraction of the neck and pain in the cervical region, though the neuritis continued to subside. The skull was trephined by Mr. Horsley, and it was intended to perform the second stage of the operation (the intradural portion) at a later date. Before the second stage could be performed the patient died with general convulsions, coma, and respiratory failure.

Post mortem an enormous cyst was found in the left occipital lobe. A small piece of sarcomatous tissue, 2mm. thick, was found by Dr. Colman, on microscopical examination, at one place in the posterior part of the floor of the cyst.

Dr. Gowers points out the chief practical lessons which the case teaches :—(1) That distinct local tenderness has relatively a very high.

localising value in cortical lesions. (2) That rapid subsidence of an unusually extreme swelling of the optic papilla may not have the significance that is possessed by slower subsidence.

The author also remarks that "if ever ophthalmoscopic changes suggested increased intracranial pressure, it was in this case. If ever a morbid process seemed capable of causing increase of intracranial pressure, it was in this case. Yet the condition within the eye, suggestive of the cause, subsided rapidly, while the cause remained, as far as could be afterwards discerned, unchanged." The mechanism by which increased intracranial pressure is supposed to act in causing optic neuritis is by distension of the sheath of the nerve behind the eye. "In this case there was no distension of the sheath, and there was not the least evidence of past distension."

STERN (H.). "A rational diabetic flour."—*Medical News*, June 8, 1895.

THE author recommends the use of the kernel of the pea-nut (*Arachis hypogæe*) as a food for diabetic patients. The average of all available analyses shows that it contains 29 per cent of proteids, 49 per cent of fat, and 14 per cent of carbohydrates in the dry material. The oil is extracted on a large scale in European countries, and utilised as a substitute for olive oil for lubricating purposes, and in the manufacture of soap. The meal contains about 52 per cent of proteids, 8 per cent of fat, and 27 per cent of carbohydrates.

The author points out that the pea-nut is one of the cheapest food-stuffs known to us; it contains a large amount of nitrogenous and fatty matter, and little carbohydrates. Directions are given for the preparation of a "diabetic pea-nut flour." The pea-nut kernels are boiled in water for half-an-hour to extract a portion of the oil which they contain. The kernels are then dried and pounded into fine particles by a rolling-pin. The pounded kernels are then placed in boiling water, acidulated with tartaric acid or vinegar, in order (1) to extract saccharine elements; (2) to overcome the smell and taste of the pea-nut; (3) to prevent emulsification of the remaining oil. After having undergone a thorough boiling with acidulated water, the ground kernels are subjected to dry heat and then rolled into fine flour. The flour may be used in the form of porridge, with milk; bread and biscuits can be baked from it; but the nicest and most easily digestible form in which it can be utilised is the German pancake.

[For the details with respect to the preparation the reader is referred to the original.]

The author begins with 15 grammes of the flour daily, and gradually increases it up to 25 grammes daily in the second week, 35 grammes daily in the third week, and so forth.

R. T. Williamson.

AMES (DELANO). "Primary carcinoma of the gall bladder." *Johns Hopkins Hospital Bulletin*, Vol. V., No. 41, pp. 74—80.

AFTER reporting several cases the author briefly reviews our present knowledge as to the pathology of primary cancer of the gall-bladder.

The literature of the subject is all of comparatively recent date; the most important contributions having been made within the last five years. The first full account of a case was given in 1840 by Durand-Fardel (*Bull. Soc. Anat.*, 1838, XIII., pp. 157—160).

In 1870 Villard was able to collect and analyse 26 cases (*Bull. Soc. Anat.*, 1870, p. 217.).

Later Courvoisier summarised 103 cases ("Kasuistische-statistische Beiträge zur Pathologie und Chirurgie der Gallenwege," Leipzig, 1890).

In England Fagge, Moxon, Habershon, and Moore have been the chief contributors. In America Musser has contributed a most interesting and important paper, in which he analyses 100 cases, and gives a brief synopsis of each (*Trans. Assoc. American Physicians*, Vol. IV., 1889, pp. 302—344.).

The more important conclusions arrived at by the author may be briefly summarised as follows:—

Primary cancer of the gall bladder is much less uncommon than was formerly believed. It occurs most frequently in females, the ratio being 3—5 : 1. It is met with more particularly in the middle decade of life. Gall-stones are found in from 91—95 per cent of the cases, and probably bear a causative relation to the disease. Metastasis is not extensive, but invasion of neighbouring organs by continuity is common.

Adhesions to adjacent organs frequently occur. Ulceration and perforation are more rare. Pain, jaundice, cachexia, emaciation, tumour, indigestion, nausea, vomiting, constipation, or diarrhoea, with occasional ascites and œdema, are the chief symptoms.

According to Musser pain occurs in 62 per cent, jaundice in 69 per cent, and tumour in 68 per cent.

The disease is always fatal, and usually in a short time, the average duration varying according to the best authorities from 3 to 6½ months. Death is due to exhaustion, peritonitis, metastasis to other organs, and to biliary obstruction.

Dr. Ames accompanies his paper by a most useful and apparently very complete bibliography.

T. N. Kelymack.

Surgery.

UNDER THE CHARGE OF THOMAS JONES, M.B., B.S., F.R.C.S.

LILIENTHAL (H.). "Unintentional neglect in the treatment of surgical diseases."—*New York Medical Journal*, June 1, 1895.

THE author draws attention to the disastrous consequences that frequently occur where action is delayed in cases of unrecognised or dimly suspected gravity. Speaking first of cancer, he points out that this is always a surgical disease, and no medicine has ever proved of the slightest avail. On the other hand, complete timely removal of the diseased area gives a promise of freedom from relapse. Yet often the patient only consults the surgeon when systemic poisoning has occurred, the fault in many cases being the physician's, who hesitates to diagnose "malignancy" before cachexia is declared. Dr. Lilienthal says it is like waiting for uræmic convulsions or coma to establish the diagnosis of renal trouble.

Too often also in cases of cancer of the tongue antisyphilitic treatment is carried on too long. If antisyphilitic measures, along with removal of sharp teeth, are not followed by noticeable improvement within a week the case is one for excision with a wide margin of apparently healthy tissue. A syphilitic history does not forbid the diagnosis of cancer, but rather makes it more probable, as cancer is prone to develop on a leukoplakial tongue.

Cancer of the breast is another disease which "seems to cause more than its share of culpability among medical men." They wait for this or that symptom; doubt malignancy until there is retraction of the nipple, immobility of the tumour, or even until the axilla is invaded. The frequent malignant degeneration of innocent growths is another reason why breast tumours should never be neglected too long. Dr. Lilienthal says that a physician who sees a breast tumour should consider himself responsible for results if he causes delay of more than four weeks in active methods of attack.

He pleads especially for early operative interference in cases of internal malignant disease, for example, in the stomach. The only hope of doing any good lies in attacking the case early, and in these aseptic days he considers an exploratory incision justifiable, as the patient risks little except a weakening of part of his abdominal wall, whilst if a cancer is found the conditions for its removal are better than ever they will be again.

Concerning intestinal obstruction, the author quotes Dr. Murphy as saying that these cases are urgently surgical, "as soon as the diagnosis

is made." Yet often operation is postponed from day to day because some symptom indicative of the greatest danger is absent ; such a sign, for example, as fæcal vomiting. When there is persistent vomiting of any kind, with abdominal pain and constipation resisting high enemata, there must be present "some anatomical, inflammatory, or neoplastic change demanding abdominal section."

The author thinks so much has been written of late of appendicitis that the profession scarcely require stirring up on this subject ; but he points out that appendicitis may exist without pain or tenderness in the right iliac region.

Empyema of the mastoid is another condition which is often allowed to go on unchecked. Without evacuation, meningitis, thrombosis of the lateral sinus, pyæmia, or some combination of these will certainly occur. Wherever marked mastoid tenderness exists after recent middle-ear suppuration, operation is indicated.

Dr. Lilienthal explains the delay in such cases as he has mentioned as due frequently to an exaggerated idea of the dangers of the operation itself. Though not wishing to minimise the seriousness of major surgical work, he considers no conscientious surgeon undertakes an operation where he believes the remedy to be more dangerous than the malady to be attacked. Very rarely does a surgeon perform an operation in these days where he might later wish he had stayed his hand. The reverse is unfortunately too frequent.

Another reason for wrong delay may be ascribed to a dependence on stereotyped combinations of symptoms learned from books, as a picture of disease.

Accurate diagnosis is a scientific and most satisfactory thing. But where this cannot be obtained, a partial diagnosis may often be made of a case for operation ; and after this, delay can rarely be productive of good.

CARTLEDGE (A. MORGAN). "Some cases of acute intestinal obstruction, with deductions."—*International Medical Magazine*, May, 1895.

THE author reports six cases of intestinal obstruction tending to confirm the accepted belief of the hopeless nature of this condition unless treated by early laparotomy.

The cause of obstruction in the first case was strangulated hernia. In the second case there was volvulus of the descending colon with abscess. The third was a case of intussusception ; whilst the fourth was a case of a band-like constriction, produced by the adhesion of two folds of the mesentery forming a mesenteric pocket. In the fifth case a patient walked across a room on the third day after laparotomy for double pyosalpinx. She was seized with agonising pain in the abdomen. At

the operation several coils of intestine were found adherent, a tightly constricted coil between the margins of the left broad ligament, and a coil stretched across and adherent to the raw surface behind the uterus. In the sixth case there was strangulation of a loop of small intestine in a snare formed by adhesion of a point of omentum to the stump of removed tube after laparotomy for double pyosalpinx.

In all these cases laparotomy was performed, three recovering, and three having a fatal result.

Dr. Cartledge considers that his cases help to prove that "the large death-rate from operation in acute intestinal obstruction does not come from lack of adequate surgical methods to deal with every phase of the lesion encountered, but from the late time at which the relief is supplied." He also points out how very serious conditions may be masked by the use of opium, and suggests that this drug might be withheld where obstruction is at all suspected till a diagnosis can be made.

"The burning question now is to educate men to know that action to be successful must be quick." A medical man need not waste his time in trying to determine whether it be a probable intussusception, volvulus, band, or diverticulum which has caused obstruction. Operation is the most reliable way of finding out. The cardinal points in avoiding a fatal delay and making an early diagnosis are to be found in sudden abdominal pain, a rapidly accelerating pulse, the vomiting of much more fluid in a given time than that taken by the mouth, the green-tinged character of this fluid, the anxious expression of countenance where opium has not been given, and the fact that although enemata may be stained by colon contents, there is no expulsive movement of the bowel and no passage of gas.

"The pulse is the sole indicator of the acuity of cause and status of the patient in intestinal obstruction. If a patient is seen at 2 p.m., and the pulse is found to be 110, to prescribe for such a patient with the determination to operate the following day if he is no better, usually means that while the physician is taking his much-needed rest that night the patient is passing for ever beyond the realm of operative relief. The next morning the physician will probably be much surprised and chagrined to find the pulse 140, and the patient moribund."

HAMILTON (H. J.). "Carcinoma of the scalp."—*Canadian Pract.*, May, 1895.

THE author mentions a case of a female patient, aged 58, with a sharply defined growth over the sagittal suture, a little in front of the position of the posterior fontanelle. This tumour was somewhat oval in shape, adherent to and involving the skin, somewhat nodular to the touch and extremely hard.

The history was of the development of a wen at the site of growth seventeen years previously. Ten years afterwards, while the patient had her head out of an open window, the window-frame fell on the wen, "flattening it out." About six months later a small lump developed, which three years later gave a discharge of dark blood. Three years later still the growth was removed by caustics and plasters. After about two months' treatment it healed up, leaving a rough corrugated scar, and immediately after healing, the present tumour developed, which grew rapidly just before the patient came under observation.

The growth was removed on February 8, 1895. It was sharply circumscribed. The wound healed nicely, and up to the present there are no signs of recurrence.

On examination, the tumour is hard and nodular. Microscopically, it is seen to be made up of dense stroma of vascular connective tissue, in the alveoli of which are large masses of epithelial cells.

The author refers to the embryological theories of cancer, as opposed to the parasitic, and considers that until further proof is given to the contrary, it seems rational to maintain that all neoplasms develop from cells of the blastoderm.

He makes some further interesting comments on the pathogeny of cancer. He discredits the agency of micro-organisms, and thinks that Cohnheim's theory of cells displaced during embryonic life does not go far enough. He thinks it is more rational to believe neoplasms may arise wherever undifferentiated cells are present, and that they are most prone to originate where these cells are most abundant. He considers we cannot safely say repeated irritations of long duration are necessary antecedents of cancer, for we fail to find chronic irritation in many cases. We are only justified in believing that parts chronically irritated may be more likely to take on neoplastic developments.

F. J. H. Coutts.

Midwifery and Diseases of Women.

UNDER THE CHARGE OF W. J. SINCLAIR, M.A., M.D.

LEOPOLD. "Myomectomy during pregnancy."—*American Journal of Obstetrics*, May, 1895.

In this paper Leopold records a case in which he operated successfully. The tumour, about the size of a fist, was situated on the anterior wall of the uterus; it was freely movable, but extended somewhat deeply

into the muscular coat. The operation was done at the sixth month, and the pregnancy went on to full term, a living child being easily delivered. He gives an analysis of all the cases recorded up to the present time, 31 in number. The chief complications which interstitial myomata lead to, are :—

A. *During Pregnancy*.—(1) Incarceration through the rapid growth of the tumour ; (2) compression symptoms ; (3) nervous disturbances, paraplegia, and ataxia ; (4) thrombosis in the adjacent pelvic organs and in the veins of the thigh ; (5) tendency to abortion.

B. *During Labour*.—(1) Abnormal presentations ; (2) irregular and feeble pains ; (3) obstruction ; (4) rupture of the uterus ; (5) hæmorrhage ; (6) impossibility to deliver *per vias naturales*.

C. *During the Third Stage*.—Post-partum hæmorrhage.

D. *During Puerperal Period*.—Sepsis from sloughing of the tumour.

The mortality in the published cases of myomectomy is 22 per cent of the mothers and 46 per cent of the children. The results obtained in the cases operated upon during the last decade are much better. With regard to the effect of the operation on the pregnancy : of the 24 women who recovered, seven miscarried, the remainder went on to the term. Three of the miscarriages occurred on the first day after operation, and three between the tenth and seventeenth days ; one occurred two-and-a-half months after the operation, and probably could not be attributed to it. Several of the fatal cases miscarried shortly before death. The size of the tumours removed varied from that of a hazel nut to one weighing 45lbs. The larger tumours were removed for symptoms of compression ; the smaller tumours may, however, cause excruciating pain, in some cases so severe that relief is necessary.

As regards the operation : if the growth is subserous, the pedicle is ligated, and the peritoneum united over the raw surface ; if the tumour is interstitial it is enucleated, and the cavity obliterated by numerous sutures. Careful checking of the hæmorrhage is of the greatest importance. The most favourable time to operate appears to be between the fourth and six months, though, from the small number of cases, no very definite conclusions can be formulated.

ROSENBERG. "Fibroid tumours of the uterus as a complication of pregnancy and labour."—*American Journal of Obstetrics*, May, 1895.

D^R. ROSENBERG records four cases under his care in which labour was complicated by fibroid tumours of the uterus.

Case 1.—Primipara, æt. 42 ; child born easily without artificial aid ; examination then showed the existence of several fibroid tumours in the

posterior uterine wall, ranging in size from a lemon to a large apple. There was some flooding during the third stage, and the placenta had to be removed manually, being adherent to the left corner of the uterus. The patient did well, and eight months later only a few nodules could be felt.

Case 2.—Primipara. During labour a fibroid was felt in the anterior uterine wall, the size of a lemon. Labour progressed slowly, and the forceps was applied. There was rather profuse hemorrhage, but the uterus contracted well.

Two weeks later the tumour was barely perceptible.

Case 3.—Primipara, set. 30. During pregnancy a pelvic hæmatocele formed. The uterus contained several fibroid tumours, one as large as a child's head. The hæmatocele was gradually absorbed. Labour came on at full term, and the child was delivered easily; forceps being applied, as the labour progressed slowly. The tumours have gradually declined in size, and the patient has had no further discomfort.

Case 4.—Secundipara. Two fibroids in the posterior uterine wall, of the size of a small lemon, discovered during labour, which was quite normal. Patient has had no trouble, and the growths have much diminished in size.

Dr. Rosenberg considers that myomectomy during pregnancy is unjustifiable, with very few exceptions.

The cases should be watched until labour begins, then, if delivery *per vias naturales* is impossible, Cæsarean section or Porro's operation should be performed. He claims that these operations would give better results than myomectomy during pregnancy.

In all the cases very marked shrinking of the tumours was observed during the puerperal period.

It should be noted, however, that in these four cases the fibroids were not of great size, the largest one attained the size of a foetal head at the end of pregnancy.

Arnold W. W. Lea.

SLAJMER (E.): Laibach. "On the treatment of spontaneous complete rupture of the uterus, with special reference to immediate closure of the peritoneal cavity. With remarks by Professor Alois Valenta."
—*Centralblatt für Gynäkologie*, No. 18, 1895.

THE author relates three cases:—(1) In this patient, vii.-para, aged 36, the rupture passed from the uterus through the roof of the right side of the vagina, leaving the external os intact. The child was extracted through this tear, as was also the placenta, which had escaped into the peritoneal cavity. The uterus was found well contracted, and hæmorrhage was very slight. Laparotomy was performed, and the laceration

of peritoneum, uterus, and pelvic floor was found to be so severe that the only procedure possible was to close the peritoneal cavity with a flap of peritoneum dissected from the posterior uterine wall; after dissection, it was about the size of the palm of the hand. The broad ligaments were now ligatured in three portions, and by joining the extremity of each to the central flap of peritoneum a septum was formed which, sewn to the parietal peritoneum, completely shut off the laceration from the general peritoneal cavity. An elastic ligature was then placed around the uterus, and all that portion of the viscus above it removed; the stump with the ligature was drawn through the tear into the vagina, and alongside it were placed a strip of iodoform gauze and a thick drainage tube. The pre-peritoneal cavity was finally packed with iodoform gauze and a drainage tube placed. The elastic ligature came away on the thirteenth day, and the patient recovered well.

(2) This patient's age was 38; she was a iii.-para, and sustained a complete rupture of the uterus, which was only ascertained after extraction of the child by forceps; the placenta was expelled spontaneously. The abdomen was opened, and the same methods employed as in the first case. Death from œdema of the lungs.

(3) The patient was a v.-para, aged 33. A shoulder presented, but after the occurrence of the rupture the child and placenta passed into the peritoneal cavity. One hand, however, presented. The case was treated similarly to the two foregoing. Death on the ninth day. Post mortem there was found cicatricial stenosis of the right ureter, leading to kidney changes. There was also stenosis of the aortic valve, and hypertrophy of the left ventricle.

Professor v. Valenta considers the first case a unique one; its successful result certainly shows that laparotomy was indicated. In the other two the result would have been the same had nothing been done.

KIERSNOWSKI (A.). "The regeneration of the uterine epithelium after parturition." [*Inaugural Dissertation*, Dorpat, 1894.]—*Centralblatt für Gynäkologie*, No. 17, 1895.

THE author made his observations on dogs, cats, rabbits, and guinea-pigs. They were killed from one to six days after parturition, their uteri excised, fixed, hardened, and sectionised in the usual way. The author concluded from his observations that Duval's view of the regeneration of the epithelium from the deep-lying cells of the connective tissue of the mucous membrane was incorrect, and confirmed Strahl's observations. He sums up thus:—

(1) The decidua vera is not formed in beasts of prey and rodents; the uterine epithelium is single layered in guinea-pigs, rabbits, dogs, and

cats, and consists partly of cubical, partly of cylindrical cells. The epithelium is absent from the site of attachment of the placenta, and to a slight extent in other places.

(2) The following degenerative changes were observed in this epithelium:—Destruction of single cells and portions of the whole mucous membrane, appearance of giant-cells, rod-shaped formations between the cylindrical cells, change of position of cell nuclei from below upwards, atrophy of cilia, emigration of leucocytes in unusual numbers.

(3) The process of regeneration originates from the epithelial cells of the superficial surface of the mucous membrane or of the gland tissues. and consists in (a) displacement of the cells along the denuded surface (Strahl) whereby the cells become broader and flatter; (b) regeneration in the stricter sense by multiplication of the epithelium cells through karyokinesis, chiefly in the neighbourhood of the defective areas.

Gow (W. J.): London. "A note on vaginal secretion."—*Trans. Obstet. Soc. Lond.*, p. 52, Vol. XXXVI, 1894.

If glands are present in the vagina their number is very limited. The process of secretion from the vagina consists mainly "in a desquamation or shedding of the superficial layers associated with a certain amount of active transudation of albuminous fluid." The author examined vaginal secretions in cases where the uterus had been extirpated, and where after healing of the wound there was no evidence of any disease. The secretion was white and opaque, or yellowish—due to the presence of cells which under the microscope appeared flattened and granular, and resembled the squamous cells of the vagina. Boiling of a mixture of secretion and water caused coagulation. The xantho-proteic and biuret reactions were both obtainable, hence the author argues that mucin, if present at all, only exists in a very minute proportion, and recommends that the term "vaginal mucus" should be discontinued. He experimented to ascertain whether the acidity of vaginal secretion exists at the moment it is poured out from the vaginal walls, or whether it results from decomposition due to bacterial action. The vagina of a patient whose vaginal secretion was known to be acid, was disinfected with 2½ per cent carbolic acid lotion. Then a plug of absorbent cotton wool, previously soaked in a strong solution of blue litmus and dried (having then a pinkish-violet colour) was wrung out of the carbolic lotion (which does not alter the blue colour of litmus) and passed up to the fundus vaginae, the lower part of the vagina being plugged with iodoform wool. Eighteen hours later the litmus plug was removed and found to be covered with a sticky secretion and to have a bright blue colour.

Gow believes this result is in favour of the alkaline reaction of vaginal secretion at the moment of formation, and that the acidity depends on changes wrought by bacteria which, as Döderlein and others have shown, are always present in the vagina. The nature of the acid has not been definitely ascertained.

Arthur Wallace.

Pharmacology and Therapeutics.

UNDER THE CHARGE OF D. J. LEECH, M.D., D.Sc., F.R.C.P.

LIEBRECHT (A.). "Argonin."—*Therap. Monats.*, June, 1895.

IN the treatment of catarrh of mucous membranes by nitrate of silver, the astringent effect is probably of less importance than the property this salt possesses of destroying bacteria. Indeed, it is a question whether the irritating effect it has on the diseased mucous membrane is not an evil. The insoluble compound which nitrate of silver forms with albumen is an objection to its use as an antiseptic agent. The ammoniacal solution of silver is objectionable on account of the caustic action of the free ammonia.

A solution of silver phosphate in ethylene diamine—argentamin—is strongly alkaline, and acts as if it contained free alkali. It likewise precipitates albumen to some extent, and also causes strong irritation of the mucous membrane.

A combination of silver with albumen, which is not alkaline and still possesses bactericidal properties, may be obtained by mixing a sodium compound of casein with silver nitrate and precipitating the mixture with alcohol. The precipitate is in the form of a fine white powder, and has received the name of argonin.

It is easily soluble in hot water, and with difficulty in cold water, but a ten per cent solution can be prepared. The solution decomposes with light; it is neutral, and precipitated by acids.

Argonin is easily soluble in albumen, and a ten per cent solution in serum can be made.

The silver of argonin is not detectable with ordinary reagents, thus, for example, chloride of sodium or alkaline sulphides give no precipitate with it.

Dr. Meyer has shown that argonin has considerable antiseptic strength, though in watery solution it is less powerful than silver nitrate.

In albuminous solutions the anti-bacterial action of argonin is lessened somewhat, but not so much so as in the case of silver nitrate. It would appear that the bactericidal action of silver depends not on the insoluble compound of albumen and silver, but is produced by the action of the metal itself. It is found, too, that a solution of argonin injected subcutaneously produces death with the ordinary symptoms of acute metallic poisoning.

After a corresponding injection of nitrate of silver, the animal lived a week.

Argonin does not irritate the mucous membrane.

D. J. Leech.

BRAMWELL (BYROM). "Treatment of the diseases of the heart."—*Edinburgh Medical Journal*, May, 1895.

BALFOUR (G. W.). "Cardiac therapeutics."—*Edinburgh Medical Journal*, June, 1895.

BROADBENT (J. F. H.). "On treatment of chronic heart disease by the methods of Dr. Schott, of Nauheim."—*Practitioner*, May, 1895.

IN the MEDICAL CHRONICLE for May, 1895, an abstract was given of a paper, read by Dr. Fraser before the Medico-Chirurgical Society of Edinburgh, opening a discussion on cardiac therapeutics.

In this paper Dr. Fraser had spoken very highly of strophanthus, for which he claimed many advantages over digitalis.

Dr. G. W. Balfour, who continued the discussion, joined issue with Dr. Fraser on this point, alleging that strophanthus had disappointed him, whilst he "had no difficulty in getting the heart to do anything he chose with digitalis." He thought medical men were far too much afraid of digitalis.

On February 20 the discussion was renewed with a paper by Dr. Byrom Bramwell. He said Dr. Fraser had chiefly limited himself to the digitalis group of remedies, and treatment of cardiac valvular disease after breakdown of compensation. He proposed to speak in his paper of general principles in the treatment of heart cases.

The first essential for successful treatment is correct diagnosis, which involves an opinion as to (1) the nature, severity, and extent of the lesion, and whether progressive or stationary; (2) condition of cardiac muscle; (3) condition of the arteries; (4) condition of tissues and organs as a whole; (5) special peculiarities and surroundings of individual.

The condition of the cardiac muscle is the key to cardiac therapeutics. The determination of the exact condition is often very difficult.

In trying to arrive at it, we must observe (1) the size of the heart ; (2) whether hypertrophy or dilatation is predominant ; (3) the way in which the heart is acting and contracting, whether forcibly, irregularly, and the like ; (4) condition of the peripheral, arterial, venous, and capillary circulations ; (5) the way in which circulation is carried on as indicated by absence or presence of dyspnoea, palpitation, cardiac pain, etc., during rest, or under strain ; (6) the way in which the heart muscle responds to tonic remedies.

The condition of the blood, aorta, stomach, liver, intestines, kidneys, lungs, and nervous system is of importance, and also the temperament of the patient.

In neurotic, functional, and curable conditions of cardiac disturbance the essential objects of treatment are :—(1) To remove the cause ; (2) to correct any deranged or abnormal condition in the heart or other organs. When the patient is anæmic, the treatment of the anæmia is required. If the gastro-intestinal functions are deranged, these need attending to. (3) To carefully regulate the whole mode of life of the individual, even down to minute details ; (4) to reassure the patient as to the curable nature of the condition, and the absence of organic disease ; (5) to give remedies likely to soothe an irritable heart and tone it up when it is in the condition of irritable weakness.

Dr. Bramwell uses in these cases belladonna plasters to the pericardium. Hydrobromic acid or potassium bromide internally, together with strychnine or nux vomica, or iron and arsenic may be useful.

Organic Lesions.—In very severe acute lesions, such as rupture of the heart, or of a valve, ulcerative endocarditis, etc., treatment is of no avail, or of comparatively little use. In less severe acute lesions, on the other hand, such as acute simple rheumatic endocarditis, much can be done by appropriate treatment to limit the severity of the morbid process, and to prevent the development of grave permanent change. Long-continued rest is of the highest importance.

The nutrition of the patient should be maintained, the condition of the various functions carefully regulated, and general and cardiac tonics, such as quinine, strychnine, arsenic and iron should be employed. When symptoms of heart-failure or embarrassed circulation appear, digitalis or strophanthus should be given.

In cases of chronic and incurable valvular disease, where compensatory changes are satisfactory, the chief indications are :—To prevent cardiac strain, and avoid everything likely to embarrass the damaged heart and to aggravate or lead to fresh activity in the lesion ; to keep the heart muscle in the highest possible state of health and efficiency. Cardiac strain may be due to external causes, such as over-exertion, or internal causes, such as a gouty condition, with high arterial tension.

So long as compensation is well maintained the more powerful cardiac tonics, such as digitalis and strophanthus, are unnecessary and may be harmful. In temporary breakdowns of compensation, the enfeebled right heart may be aided by digitalis, strophanthus, strychnine, alcohol, etc., and, if greatly engorged, the strain may be relieved by venesection.

In cardiac cases of all kinds, after breakdown of compensation, the treatment has to be guided by the opinion as to the nature of the lesion and the condition of the heart muscle.

Dr. Bramwell, towards the close of his paper, refers to some individual lesions, and the appropriate treatment.

Fatty degeneration, due to deficiency of hæmoglobin, as the result of anæmia, demands treatment with iron or arsenic.

In cases of fatty degeneration, due to pernicious anæmia, there is no remedy like arsenic.

In fatty degeneration due to disease of the coronary arteries, arsenic and strychnine, alone or in combination, are to be preferred to digitalis or strophanthus.

In cases of fatty infiltration and flabby heart, careful regulation of the bowels, fresh air, and carefully regulated exercise, together with arsenic and strychnine are the best measures to employ.

In cases of senile, debilitated, and fatty hearts, and in cases of mitral regurgitation with high blood pressure and constricted vessels, careful regulation of the diet, distilled water, salicylate of soda, and arsenic and strychnine may be employed. Iodide of potassium is often advantageous. Where a cardiac tonic is required strophanthus is probably preferable to digitalis, as Prof. Fraser claims that it acts without constricting the peripheral arteries.

In cases of chronic myocarditis and fibroid degeneration rest is essential. Digitalis, arsenic, strychnine, and iodide of potassium may all do good.

In cases of advanced valvular disease with defective compensation, large doses of digitalis or strophanthus should be employed.

In angina pectoris, with high blood tension, nitroglycerine or amyl nitrite are effective, but in cases of advanced cardiac degeneration, or free aortic regurgitation, with a soft pulse, they are useless, or even dangerous. Here diffusible stimulants and morphia injections are the most efficient remedies.

On the 27th of February Dr. G. W. Balfour continued the discussion by a paper entitled "Cardiac Therapeutics." He felt that the discussion had diverged from general cardiac therapeutics into a controversy as to the merits of two special drugs.

In a case of probable cardiac disease a careful investigation of the whole case must be made, and especially of those organs, lungs, liver, and

kidneys, which are so closely connected with the heart. The prominent symptom complained of is often a guide to the nature of the case, and an indication for treatment, but the physician must endeavour to understand what the symptom means, and to discover its connections with other phenomena present. Palpitation, for instance, is a symptom with many meanings, calling for varied therapeutic measures. Similarly with breathlessness, and even œdema may be due not so much to cardiac debility as to the influence of position, accidental compression of veins, or imperfect constitution of the blood. The condition of the heart must also be carefully investigated.

Dr. Balfour considers it is impossible to ascertain during life whether the coronaries are atheromatous or not, or whether the heart is fatty or not; he considers even the most energetic treatment is not likely to damage a heart even if it is fatty.

It is an error always to suppose that recovery or improvement has been due to the use of this or that drug. Many cases recover under the influence of rest and diet alone.

Where cardiac compensation is incomplete, rest is paramount. In the early stages of a gouty heart exercise may be of benefit if carefully carried out. Excessive exercise tends to promote irremediable failure of the heart.

Massage may often promote the nutrition of the skeletal muscles, and obtain the benefits of exertion without any of its risks.

Diet is of extreme importance, but its principles are easily understood. A cardiac patient has feeble digestion, and must, therefore, avoid indigestible substances, and take only small quantities at each meal.

Drugs of use in cardiac cases are not numerous, but are very valuable.

Nux vomica or strychnine is of great value where cardiac energy is defective without evidence of structural lesion, and its use may be continued a long time, even years. Five minims of the liquor strychninæ every twelve hours is about the largest safe dose for continuous administration. Strychnine also acts as an admirable gastric tonic.

Arsenic is often useful, improving the whole tone of the stomach.

Digitalis, however, is of paramount importance, improving the nutrition of the myocardium, contracting dilated ventricles, and removing dropsy. One grain of powdered leaves every 12 or 24 hours is usually sufficient.

Digitalin, in the form of Nativelle's granules, and Merck's, in doses of $\frac{1}{100}$ grain, is well adapted for producing tonic action, although apt to cause sickness. Larger doses of *digitalis* may be given in some cases, e.g., flabby dilated hearts, but require watching.

Other diuretics are often of service in removal of dropsy, and may be combined with *digitalis*.

Nitrites and iodide of potassium may be used to lower blood-pressure and allow digitalis to act beneficially where it might otherwise do harm.

Sedatives, such as bromides, are often serviceable in soothing irritable hearts.

Morphia is the chief narcotic, but it must be given in large enough doses.

Paraldehyde is a good hypnotic. Chloralose lowers blood-pressure, does not quicken the heart like chloralamide, but seems to steady it; four grains may be given in cachet at bedtime.

Dr. Broadbent during a recent visit to Nauheim had the opportunity of observing Dr. Schott's method of treatment of chronic heart disease. He describes the treatment in the *Practitioner* as twofold: (1) Baths containing mineral substances and free carbonic acid gas in solution; (2) graduated gentle exercises or gymnastics.

In healthy people the baths cause in one to three minutes slowing of the pulse with increase in force and volume, and these effects are still more marked in patients who have cardiac disease. In dilated hearts a diminution of the area of dulness is observed, and the liver, when enlarged as a result of right ventricle failure, also diminishes in size. Dr. Schott believes the baths act reflexly by stimulating the sensory nerve endings,

The gymnastics consist of a series of simple movements of each limb and of the trunk against slight resistance, so that every muscle, as far as possible, is in turn brought into play. The results are diminution of frequency and increase in volume and force of the pulse, with diminished area of cardiac dulness in cases of dilatation and reduction in size of the liver.

Cases most likely to derive benefit are those of cardiac dilatation from overwork or mental worry, and cases of mitral disease with failing right ventricle and threatening breakdown of compensation. Cases of aortic incompetence are unsuitable unless symptoms of right ventricle failure have supervened. Cases of aortic aneurism are also unsuitable, as the frequent changes of blood-pressure can only do harm. In true angina pectoris the method should only be practised with great caution, if at all.

In cases of fatty heart—fatty infiltration, not fatty degeneration—the treatment should be beneficial.

ROSE (A.) "Therapeutic effects of carbonic acid in dysentery, in the vomiting of pregnancy, in whooping cough, in prostatitis, and in impotence."—*New York Med. Journ.*, March 9, 1895.

DEMARQUAY has used carbonic acid gas in the treatment of chronic ulcers of the leg; Johnson has reported excellent results from the appli-

cation of carbonic acid gas to diphtheritic ulcers; Broca and others have applied carbonic acid in neuralgias of various forms amenable to local treatment with great benefit. The good effects of carbonic acid on ulcerating surfaces suggested to Dr. Rose its employment to the mucous membrane of the rectum. He used it first in a case of obstinate dysentery, inflating the rectum with carbonic acid gas. This was at once followed by a change for the better. The applications were continued three times a day, till the speedy recovery of the patient made them unnecessary. There was no discomfort with the application, but an agreeable sensation. For eleven years Dr. Rose has followed out this method of treatment with similar gratifying results in cases of dysentery. The carbonic acid gas, as a rule, does not pass the ileo-cæcal valve.

In 1884, in a case of incessant vomiting, Dr. Rose suggested the introduction of carbonic acid gas into the vagina, believing that the anæsthetic effect of the gas on the womb might be useful, assuming the vomiting to be reflex, originating in neurosis of the womb. Later, he found that inflation of the rectum with CO₂ had a more stimulating effect on the sexual organs than direct application. He has used this plan with gratifying results in obstinate vomiting in pregnancy.

Since 1887 Bergeon has been using CO₂ in whooping cough. He injects it into the rectum immediately after an attack, provided three hours have elapsed since the last meal. According to Bergeon, the severest forms require only a week of treatment. Dr. Rose has employed the method since May, 1894, with good effects in all but a few cases. Relief was observed in the very first days, and the patients were entirely cured in from eight days to two weeks.

Carbonic acid gas, from whatever part of the body it may be absorbed, enters through the venous system into the lungs, and from there it is exhaled. A. Ephraim assumes that by the increased amount of CO₂ passing from the blood into the alveoli an increased exchange and diffusion of oxygen and carbonic acid gas is brought about, and corresponding with the increased exhalation of CO₂ there is, according to the laws of diffusion, also an increased influx of oxygen towards the alveoli.

Ephraim reports favourable results in chlorosis, phthisis, bronchitis, and asthma by administration of CO₂ per rectum. He calls it a method to improve pulmonary ventilation. According to this theory we can understand why the inhalation of pure oxygen is of comparatively little value.

Recently Dr. Rose has used CO₂ in acute and chronic prostatitis, and also in a few cases to relieve impotence. He believes inflation of the rectum with CO₂ acts as an excellent stimulus.

His apparatus, a figure of which is given, is very simple, consisting of a pint bottle with a wide mouth and a rubber stopper perforated for a glass tube, to which is attached a rubber tube connected with a nozzle for introducing into the rectum. The bottle is filled one-third with water, the tube reaching as far down as one or two inches above the level of the water. Six drachms of sodium bicarbonate are put into the water, and, when everything is ready for the inflation, half an ounce of large crystals of tartaric acid are added and the bottle closed quickly. As soon as any considerable feeling of distension is perceived the nozzle may be withdrawn.

Francis J. H. Coult.

"Some points in the therapeutics of gout, the uric acid diathesis, gravel, etc."—*New York Med. Journal*, April 20, 1895.

DR. LONDON EDWARDS considers there are strong reasons for attributing to the liver the chief part in the formation of urea. When the amount of nitrogenous foods ingested is more than this organ can cope with, or when more urea is produced than the kidneys can eliminate from the saturated blood-serum, sodium biurate is gradually deposited, giving rise to tophi, gravel, etc..

Children may be born with the uric-acid constitution, or may have uric-acid deposits in the kidneys or bladder at birth. Treatment should be to avoid catarrhal conditions of the urinary tract, use abundance of milk, and free potations of alkaline water, Dr. Edwards recommending especially Buffalo lithia water.

The growing child should get outdoor exercise, short of excess. Over-eating should be avoided, especially highly-seasoned articles, dark meats, fat, sugar, etc. Dr. Edwards thinks there has been too much abuse of purgatives in the treatment of gout. He recommends cascara sagrada.

Colchicum is a well-tried and useful remedy. It is best to give in as small doses as will produce the effect. Tincture of aconite in one or two drop doses combines well with colchicum to mitigate the pains of the gouty. Salicylate of sodium in 15 to 20 grain doses is often more valuable than colchicum.

During the intervals of the attacks potassium iodide in 5 to 8-grain doses three times daily gives much benefit.

When neurotic troubles persist, phosphate of sodium is of advantage given three times daily in drachm doses.

As a tonic for debilitated states, arsenic acts better than iron.

"Notes on a case illustrating the treatment of eczema capitis by salicylate of sodium."
—*New York Med. Journal*, April 20, 1895.

DR. CHARLES E. LOCKWOOD mentions a case of "a red, papular, scaly eruption on the scalp and forehead" of about four years' duration, which improved and finally disappeared after treatment with salicylate of sodium. The patient had suffered from rheumatism previously, but since the skin trouble began there had been no rheumatism. Dr. Lockwood prescribed salicylic acid and bicarbonate of soda in doses of 10 grains each three times a day, and half a teaspoonful of bicarbonate of sodium in carbonic acid water twice a day.

He also advised the use of black wash and a tar ointment, and later gave arsenic and iron internally, the eruption disappearing in about two months.

"Acetanilide versus quinine to abort chills and fever ; and acetanilide as a dusting powder."—*North Carolina Medical Journal*, April 20, 1895.

DR. BENJAMIN BRODNAX believes acetanilide to possess great merit in warding off "chills" in intermittent fever. If there is time before the chill he gives one and a half to two grains of calomel in quarter-grain doses half an hour apart ; then, according to age, two to six grains of acetanilid twenty minutes or half an hour before the expected chill. Gentle perspiration with natural sleep usually promptly follow within half an hour ; if not, a second dose of equal amount may be given. The after treatment consists of an acid tonic :—

R. Acid. nitro muriatici, dil. 1 ℥.
Ferri sulphatis 80 gra.

This should stand for twenty-four hours, and should be given in water ten drops three or four times a day.

Dr. Brodnax has used acetanilid in several hundred cases without quinine. He has also used acetanilid and borio acid, equal parts, as a dusting powder in ulcers, burns, etc., and found it very useful. Internally, he has used it to correct foul breath, also in dysentery and diarrhoea.

"Phytolacca decandra for epithelioma."—*North Carolina Medical Journal*, April 20, 1895.

DR. E. G. GOODMAN, of El Paso, North Carolina, claims that the green juice expressed from the leaves of the above-named plant and made into a plaster has a specific action on epithelioma. "It has a selective action for the morbid tissue ; follows out all the irregularities of the epithelioma ; causes, as it were, its liquefaction and removal, and then acts as cicatrisant for the open sore." Dr. Goodman states that under this treatment he has seen large epitheliomatous masses destroyed in a few weeks, and nothing but a faint scar left at the place occupied by the growth. The remedy causes severe pain, but may be used fearlessly, as it does not endanger the patient.

"A contribution to the quinine treatment of tussis convulsiva."—*New York Medical Journal*, May 11, 1895.

DR. THEODOR FISCHER, of Rochester, New York, states his conviction that quinine produces excellent results given in any stage of whooping cough. Quinine was used for pertussis a long time ago, but discontinued until Binz, in 1868, called the attention of the profession to it.

Dr. Fischer has treated 27 cases of whooping cough since June, 1894, and realised "remarkable results." Improvement began at once, rapid progress was made, and the course of the disease was shortened.

The drug must be given in fairly large doses— $\frac{1}{2}$ grain for the month or $1\frac{1}{2}$ grains for the year of the patient, three times a day ; but the highest single dose not to exceed 7 grains.

Diseases of the Ear.

UNDER THE CHARGE OF W. MILLIGAN, M.D.

NOTES ON POST-INFLUENZAL OTITIS MEDIA SUPPURATIVA.

DURING the recent epidemics of influenza various ear complications of a more or less severe character have supervened. In a few cases the writer has observed hæmorrhagic bullæ upon the surface of the membrana tympani, which, after free incision, have disappeared without producing any further symptoms. In other cases attacks of acute middle ear catarrh, accompanied by the exudation of large quantities of a sero-sanguineous secretion, have occurred. In yet other cases the attack has been accompanied by the extravasation into the cavity of the middle ear of large quantities of blood, so as to constitute that form of middle ear inflammation known as the hæmorrhagic variety. In many of these cases the pain has been of the most acute character, even after free paracentesis has been performed. In certain other cases mastoid symptoms of an acute character have occurred, demanding an early and free opening of the apophysis. The peculiarity of many of these cases appears to be the formation of a subcortical mastoid abscess, unconnected with the cavity of the antrum, and necessitating neither an extension of the opening into the antrum nor the establishment of a connection with the cavity of the middle ear. In all probability many of these cases of mastoid disease following influenza originate primarily in the diploic tissue of the process, and affect the middle ear secondarily. Acute cario-necrosis of the apophysis is a not unfrequent result. The treatment of the affection should be that of any ordinary case of severe middle ear inflammation, while at the same time the general strength of the patient must be maintained by the administration of a liberal diet and the exhibition of stimulants. Early and free paracentesis should be performed in those cases where the membrane is livid from congestion, or where it is bulging from the presence of pent-up secretion. Even after a free paracentesis pain may last for a considerable time. When this is so the application of half-a-dozen leeches in front of the tragus will be found to afford considerable relief. Washing out the middle ear with warm and dilute solutions of bicarbonate of soda tends also to diminish tension, and consequently the feeling of fulness and pain. When the mastoid process is involved no time should be lost in opening and draining the cells. In most cases it is sufficient to remove the cortex, when a subcortical abscess will usually be found. All diseased mucous membrane

and softened bone should be scraped away, and the cavity well dried and packed with iodoform gauze. In the following three cases such a line of procedure was adopted with satisfactory results:—

Case 1.—E. A., aged 64, during an attack of influenza experienced severe pain in his left ear. The pain gradually increased in severity and radiated from the ear over the corresponding side of the head. When seen one week later the following condition was found: The left temporal and mastoid regions were enormously swollen and infiltrated, and palpation over the latter region gave the impression of deep-seated pus. The external meatus was so narrow, owing to the postero-superior walls being pressed downwards and forwards by the surrounding infiltration of the tissues, that no view of the membrana tympani was obtainable. The temperature was 102.5° F., the pulse rapid, and the bowels constipated. Immediate operation was advised. Upon the following day the patient was put under chloroform and the usual incision made over the mastoid process. The bone was reached at the depth of three-quarters of an inch, owing to the enormous infiltration of the tissues, and a small quantity of pus was liberated. Careful examination was made for the existence of a fistula, but none was found. It was, however, considered advisable, from the character of the symptoms, to open the mastoid process. This was accordingly done by means of a mallet and gouge, the opening being made towards the mastoid apex. After the cortex had been chipped away, a large subcortical abscess was found. All debris, diseased mucous membrane, and softened bone was scraped away, but no communication was made with the antrum or the middle ear. The cavity was stuffed with iodoform gauze and the usual dressings were applied. The oedema rapidly subsided. The membrana tympani was now seen to be perforated in its upper and posterior segment, and suitable treatment was adopted. The perforation healed, and the patient returned home three weeks after the operation had been performed.

Case 2.—W. A., aged 38, developed an attack of acute left-sided suppurative middle ear disease while suffering from influenza. When seen a fortnight afterwards the membrana tympani was found perforated, and great tenderness was complained of over the mastoid process, especially about the apex. The patient's temperature measured 101° F. Under chloroform the mastoid process was opened and a subcortical abscess found. This was scraped of all diseased contents and packed with dry iodoform gauze. Rapid healing took place.

Case 3.—R. L., aged 14, developed an attack of suppurative middle ear disease (left) during an epidemic of influenza. No great pain was complained of until a fortnight after the attack had commenced, when tenderness was experienced over the corresponding mastoid process. When seen one week later, i.e. three weeks after the commencement of the ear symptoms, a subperiosteal mastoid abscess was found present. This was opened under chloroform and emptied. Examination of the bone revealed the presence of a small fistula, from which pus was oozing. This was enlarged by means of a Volkmann's spoon, when a subcortical abscess cavity was found. The contents were scraped out and the cavity packed. Rapid healing took place.

CONNAL (J. G.). "Discharge of tympanic ossicles in suppurative middle ear disease."—*The Glasgow Medical Journal*, June, 1895.

THE patient, a boy aged 7, suffered from a severe attack of scarlet fever followed by a purulent discharge from the middle ears. When seen by

the author the discharge was found to be profuse and foetid. During the syringing of the ears the malleus and incus came away upon both sides. No trace of the stapes was to be found in either ear. The tympanic membrane upon the right side was almost entirely destroyed, while upon the left side a large perforation was found in the anterior inferior segment. The author refers to the following points of interest: The symmetrical character of the lesion and the rapidity of the destructive process. The ossicles when examined were found to be anatomically perfect, the inflammatory process having evidently spent itself in causing disarticulation of the bones. The total loss of hearing which was present was attributed by the author to a coincident labyrinthitis.

KNAPP (H.). "Two cases of ear diseases with brain symptoms; mastoid operations in both; recovery in one; death in the other."—*Transactions of the American Otological Society*, Vol. V., Part 3.

Case 1.—Extensive caries and necrosis of the temporal bone of a child; mastoid operation; death from exhaustion and hæmorrhage forty-two days later.

The patient, a very anæmic child, was brought to the hospital with the history that during the preceding three or four months there had existed offensive left-sided purulent middle-ear disease. The mastoid region upon the left side was swollen, bluish, and soft, but no fluctuation existed. After an incision had been made, the outer cortex of the bone was found brittle and easily broken into by chiselling. Complete removal of the outer table laid bare a large cavity filled with soft and necrosed bone and granulations bathed in this offensive pus. All the diseased tissue was scraped out, and a large cavity thus formed comprising the interior of the mastoid process, the tympanic cavity, and the adjacent portion of the petrous bone. The cavity was filled with sublimate gauze, and daily irrigations were carried out. No tendency to repair seemed to exist in the wound, and when dressed the granulating surfaces bled somewhat freely. A week before the child's death palpation with a probe showed that the posterior meatal wall had begun to get loosened. The case was watched and regularly dressed. During one night hæmorrhage from the wound was continuous, and the following day the child died.

The author did not consider that the hæmorrhage had been the actual cause of the child's death, but that in the exceedingly precarious condition of the child's health it may have contributed to hasten it.

Case 2.—A case of chronic middle ear suppuration with grave brain and lung complications ; opening of the mastoid ; wounding of the lateral sinus ; complete recovery.

In this case the patient, a healthy-looking woman, aged 38, consulted the author on account of pain, discharge, and deafness in the left ear. The trouble had lasted for one year. On three separate occasions the author found the attic and the posterior part of the canal so much swollen, together with pain in the head and ear, and stoppage of the discharge, that he advised operation ; but upon each occasion when the patient presented herself for this purpose the condition was so much improved that he did not consider operation justifiable. Shortly afterwards, however, things took a more serious turn, the pain in the head becoming severe, and delirium, stupor, and vomiting being present. The mastoid process was found red and tender, the optic disc distinctly hyperæmic and swollen. The patient complained of the chest feeling uncomfortable, but no definite symptoms upon percussion or auscultation could be heard. The pulse was 120, the respirations 30. Under ether the mastoid process was opened, but neither pus nor granulation tissue was found. During the process of chiselling a sudden gush of dark blood took place. The cavity was at once packed with sublimate gauze and dressed in the ordinary way. During the following week the patient was in a critical condition. The respirations numbered 40, the temperature 104°, and the pulse 130 ; in turn, headache, oppression of chest, drowsiness, and at times mild delirium. After the ninth day the patient began to rally, and the wound to fill up with granulations. The patient ultimately made a good recovery. The author believes that the purulent attic disease was the origin of the difficulty, and that the inflammatory condition had passed to the base of the brain. In such cases he would advocate free opening of the cupola of the drum cavity, and removal of the discharge by means of an intra-tympanic syringe. Failing this, that a free communication should be made between the drum cavity and the mastoid antrum, according to the operative methods of Schwartz or Stacke.

McBRIDE (P.). "Some questions with regard to the diagnosis, prognosis and treatment of suppuration in certain osseous cavities."—*Edin. Med. Jour.*, June, 1895.

THE author remarks at the outset that the great desideratum in the treatment of chronic suppurative middle ear disease is free drainage. In acute cases a free paracentesis may be all that is required, while

in certain chronic cases excision of the membrane and malleus with or without the incus may be sufficient to arrest purulency.

Cases of middle ear suppuration of recent origin, and in which no great amount of destruction of the drum membrane has taken place, are usually curable by Schwartz's operation alone. This being so it gives rise to the question whether in cases of sub-acute suppuration threatening to become chronic, it would not be advisable to open and drain the antrum more frequently than is usually done. To decide the question the surgeon must weigh carefully the various *pros* and *cons*. On the one side the operation of opening the antrum is not altogether free from risk, while on the other hand the risks to hearing, and in a minor degree to life, as the result of chronic suppuration must not be lost sight of.

In chronic cases the author states that he has but rarely seen complete cures, that is, absolute arrest of suppuration. The author is not in favour of opening every mastoid in cases of chronic suppuration which have resisted treatment for a year. He thinks that in most cases with the co-operation of the patient the discharge can be reduced to a minimum by treatment applied through the external meatus, while in cases of attic suppuration much can be done by removal of the membrane and diseased ossicles. In such chronic cases if the middle ear be kept clean and treated upon otological lines, the discharge may cease for a time, or even permanently.

In cases, however, where the middle ear structures have been opened up the author's practice is to syringe thoroughly with a 1—2000 bi-chloride solution, then dry carefully and fill the cavities with a mixture of iodoform and boracic powders (1—4). The wound and the meatus should be carefully plugged with iodoform gauze, and when the posterior meatal wall has been removed the meatus must be carefully kept plugged, so as to avoid any stenosis following. On account of the author's rarely finding a complete cure of the purulent process, he is inclined to make frequent use of the lead nail, which can be worn without discomfort, and which permits of thorough cleansing with antiseptic lotions, in those cases which have failed to be cured by the dry method of treatment. Also because the lead spigot has to be so frequently worn after these operations, the author inclines to the performance of the ordinary Schwartz operation in preference to the more modern operations, which require removal of the posterior meatal wall.

W. Milligan.

Diseases of the Throat and Nose.

UNDER THE CHARGE OF A. HODGKINSON, M.B., B.Sc.

CHIARI. "Circumscribed keratosis of the larynx."—*Prager medicinische Wochenschrift*, March 1, 1895.

DR. OTTOKAR CHIARI describes a case of this rare disease, first noticed by Infinger in the *Wiener klin. Wochenschrift*, No. 47, 1891. The patient was seen first in September, 1892. She was a governess, 25 years of age, born in England, anæmic, and had never enjoyed robust health. For seven years she had been hoarse, and had been troubled by slight cough.

Condition of Upper Air Passages.—There was pharyngitis sicca, and atrophic rhinitis, with a few crusts adhering to the mucous membrane of the nose. In the larynx, the mucous membrane was pale; the anterior portion of the right vocal cord was covered by thick white mucus, on removal of which it could be seen that the anterior portions of both vocal cords were thickened, and covered with white, chalky-looking masses. Under the anterior commissure, a pale red swelling, about half the size of a linseed, could be seen.

Operation.—After local anæsthesia had been produced by the application of solution of cocaine, 20 per cent, the chalky-looking masses were easily removed by means of fine toothed forceps; they were found to be horny to the touch. The subchordal growth was scraped, but was too hard to be removable by the forceps. The patient objected to further operation. She was instructed to spray the throat frequently with half per cent solutions of common salt. Two months later the voice was better, but not quite strong.

Examination of Tissue Removed.—The tumour removed from the cords looked like chalky-white scales, and felt horny. Thin sections showed under the microscope structureless fibres lying parallel, stained by picrine, but not by carmine. Carmine only stained a few micro-organisms lying in the detritus surrounding the horny mass. In the middle of the tumour no structure could be made out, the fibres appearing towards the periphery. The fibres were bent, but not cracked. The hardness, the staining reactions, the homogeneity at one part, and the structureless fibres at another part, showed that the tumour was composed of horny substance. That this substance was derived from

epithelium cells was not to be doubted, as here and there some wasted nuclei were found lying between the fibres. Springing from the surface of the tumour were a few horny, flat, little scales, which resembled exactly the horny upper layer of epithelial cells as seen on the surface of the body. No nucleated cells were found. The fragments scratched off from the subchordal growth were composed of thickened epithelium.

Further Progress of the Patient.—In October, 1894, more than two years after the operation, the patient was seen again, and reported that, with the exception of slight hoarseness, which had come on again recently, she had been in good voice since the operation. The vocal cords were slightly paretic, but otherwise normal in appearance. Under the anterior commissure was a white flat thickening, which, on the first appearance of the patient, was pale red. That there was no recurrence on the cords after two years was probably due to the use of the half per cent salt solution spray, which caused the horny cells to be cast off singly, so that they were not allowed to remain in position long enough to cohere and form a tumour.

Causation.—Dr. Chiari attributes the formation of the horny masses to the same cause as that of the atrophic changes in the nose and pharynx, and refers to Schuchardt (*Volkmann's Sammlung klin. Vorträge*, No. 340, X. Heft der XII. Serie) and Seifert (*Vortrag. am X. Internat. Med. Cong., Berlin, 1890*) as authorities that in atrophic rhinitis the cylinder epithelium of the nasal mucous membrane is frequently changed to stratified epithelium, with horning of the superficial layers. In mucous membranes covered by laminated epithelium horning of the superficial layers is quite common as a result of constant irritation, as on the lips, the tongue, the vocal cords, interarytenoid space (pachydermia); but as only a few layers of cells are altered, and these cast off soon after formation, it is extremely rare that the process goes on to form horny substance recognisable without the microscope. There are only two other cases reported by: (1) Jurasz (*Berlin. klin. Wochenschrift*, 1886)—a papilloma with spines, which proved to be horning of the epithelium covering the tops of the papillæ. (2) Inffinger (*Wiener klin. Wochenschrift*, No. 47, 1891)—A girl of 16 suffering from atrophic rhinitis, with a mass about the size of a linseed, from which projected three spines seated under the anterior commissure of the vocal cords. These spines were composed of horny epithelial cells closely pressed together, and overlying an epithelium composed of many layers, which was penetrated in two places by papillæ of the subjacent connective tissue.

Remarks.—The absence of nucleated cells—i.e., of the Malpighian layer, as shown in the examination of the tumour removed by Dr.

Chiari—is the histological diagnostic point of keratosis as distinct from superficial horning (callosity).—See Rindfleisch, "Path. Anat.," Vol. I., § 303. That the horny substance is so persistent in true keratosis is evidently due to the horny change taking place in the lower cells of the rete malpighis; and as the new-formed horny fibres follow the undulations between the papillæ, instead of lying parallel to the surface as in a callosity, they will form an excellent anchorage for the superjacent mass, and will not be easily shed.

These two cases reported by Chiari and Inffinger of keratosis in the larynx, associated with atrophic rhinitis, are valuable testimony to the truth of the theory, which regards atrophic rhinitis not so much as a disease in itself, but as a symptom of a trophoneurosis which may affect the nose, nasopharynx, larynx, and which may extend even further when fully developed. For unless we look upon the laryngeal and nasal lesions as of common origin, we are forced to consider the laryngeal lesion as secondary to, or independent of, the atrophic rhinitis.

If secondary to the nasal lesion, the larynx could only be affected by extension or infection, and it is quite out of the question that either extension or infection would cause a lesion in the larynx, limited to the anterior portion of the cords, and under the commissure, without leaving definite traces in parts more exposed and practically nearer to the nasal mucous membrane.

It also seems difficult to imagine a morbid process, characterised by superficial horning of the epithelium, to exist in the nose, and to have no relation to the similar morbid process of keratosis in the larynx.

"A curious case of aphonia."—*Berlin. klin. Wochenschrift*, No. 37, 1894.

A CASE of great interest, as regards the possible after-effects of a careless or unskilled laryngotomy was shown by Professor Fraenkel to the Gesellschaft der Charité-Aerzte.

The patient, a girl of 18, was absolutely aphonic. Four years ago she had undergone tracheotomy, or rather more probably laryngotomy, on account of diphtheria of the larynx, and since then had been voiceless.

Larynx.—In the usual position of the anterior commissure was a space of about 3 mm. between the vocal cords, the distance between the false cords being greater.

On attempting phonation the cords approximated normally posteriorly, but left a distinct gap anteriorly: the image thus being very similar to a case of paralysis of the arytenoideus muscle, but reversed back to front. On external palpation it was easy to make out that the two sides of the thyroid cartilage were separated by a space of about 1 or 2 mm.,

and that a gap was present in the anterior median portion of the cricoid cartilage. On pressing together the sides of the larynx, so as to obliterate the space, the patient could produce a fairly strong voice.

Operation.—A median skin incision was made over the thyroid and cricoid cartilages, the connective tissue uniting the separated sides of the thyroid and cricoid cartilages was removed, the edges of the cartilages fastened carefully, brought into exact apposition, and sutured with wires. Complete recovery of the voice ensued.

It is evident that during the laryngotomy (or intended tracheotomy) the cricoid and thyroid cartilages were accidentally divided. It seems remarkable that such an accident could occur in a girl of 14; in a baby with a fat neck it might be fairly easy to mistake the landmarks, taking the hyoid bone for the pomum adami, and thus making the incision too high.

Fraenkel has had three such cases. As far as I know, no other cases have been reported.

OERTEL. "A new method of laryngeal examination."—*Münchener medicinische Wochenschrift*, March 12, 1895.

By means of the ordinary laryngeal examination it is impossible to detect the changes in form of the vocal cords that take place during each individual vibration.

If it were possible to view the vibrating vocal cord for a moment only, the change of form at this particular phase of the vibration would be seen. If the intermission of view were to correspond in time to a complete vibration, to each successive view the cords would appear motionless, as they would always be viewed in the same phase. If the intermission of view were slightly longer than the time of a complete vibration, each successive view would show the cords in slowly altering phases, i.e., the vibrations would appear to take place slowly.

Acting on this principle, Dr. Oertel has introduced a stroboscope between the source of light and the reflector. The stroboscope he uses is a rotating disc, with three rows of circular openings corresponding to three octaves, driven by an electromotor, and regulated by a rheostat and a brake. As the discs can be used at the same time as a "Syren," it is easy to drive it at a speed corresponding to any given note, and thus produce intermissions of lighting corresponding to the vibrations of the cords, or faster or slower. In order to increase the accuracy of observation a telescopic arrangement was fixed to the reflector. Observations were made upon stretched vibrating membranes, and upon the phonating or singing larynx.

Chest Voice.—With only slight difference in speed between the light interruption and a full vibration of the cord, the surface of the cord is seen in slow upward and downward motion. The nearer to the free edge the greater the excursion. At the outer (attached) portion of the cord is a nodal line, whilst the free edge is bellied, as in transverse vibrations of a stick fixed at one end. The height of the wave corresponds to about a quarter of its length. The free edge of the cord vibrates like a string stretched between two fixed points. With the tension in both cords equal, the vibrations are synchronous; if not, the vibrations may alternate.

Falsetto Voice.—The vocal cord is divided longitudinally by a nodal line which runs parallel to the free border. The broader outer portion of the cord exhibits vibrations with the greatest excursions half way between the nodal line just mentioned and the attached edge of the cord (a nodal line here also as in the case of chest voice). In the case of a marked falsetto voice, on delivery of high notes, the author noticed two parallel nodal lines along the length of the cord. In both falsetto and chest voice the pitch is raised by increased longitudinal tension. Professor Koschlakoff, of St. Petersburg, has, in all points, confirmed Dr. Oertel's observations, excepting the double nodal line in the high falsetto voice. He could, however, demonstrate it in a larynx (post mortem) artificially thrown into vibration, where the mucous membrane, thickened by infiltration, offered a broader than usual surface for examination.

With regard to alternating vibrations in cords of unequal tension, Professor Simanowski, of St. Petersburg, extirpated in dogs the crico-thyroid muscle of one side, and in another case a portion of the superior laryngeal nerve of one side, and in both cases saw alternating vibrations in the cords. Alternating vibrations were observed in a case of chronic catarrh (clergyman's sore throat), and also in that of a singer who had lost his singing voice.

This alternating vibration is of great diagnostic value, as it points to paresis or paralysis of the crico-thyroid muscle, which is made out with great difficulty by ordinary laryngeal examination.

This method of examination is, of course, far too cumbersome and costly for ordinary medical use, but, as it has proved already from Dr. Oertel's results, will give the most valuable information on points in laryngeal work which otherwise are most difficult to elucidate, and on which we sadly require accurate information.

N. C. Haring.

Pathology and Bacteriology.

UNDER THE CHARGE OF A. SHERIDAN DELÉPINE, M.B., B.Sc.

SOME RECENT PAPERS ON THE BACTERIOLOGY OF CHOLERA.

BEFORE giving a connected account of the more recent developments of the bacteriology of cholera it will perhaps be well to recall Koch's earliest papers on the subject, in which he states that he found constantly and exclusively in stools and intestines in cholera a certain vibrio (comma bacillus) which grew on gelatine plates in colonies which had a coarsely granular aspect and an irregular outline, looking like little pieces of glass when at an early stage, and afterwards liquefied the gelatine so as form little shallow pits with the granular colonies at the bottom. The stab cultures also grew in a particular way, owing to the mode of liquefaction of gelatine. Dunham and Bujwid afterwards showed that these vibrios had the power of inducing certain chemical changes in weak saline peptone water, so that a purplish pink colour ("cholera red") was produced on adding a few drops of pure sulphuric acid to the cultivations after they had grown for a few hours at 37° C. (blood heat). Cunningham, of Calcutta, isolated various specimens of bacteria from cases of cholera, and showed that they varied much from the typical vibrios of Koch's early description, in their morphology and in their mode of growth upon various media. He especially laid great stress upon the formation of a thicker or thinner scum upon the top of broth cultivations and the rate of liquefaction of gelatine, upon the consistence of the cultivations upon agar, and upon the character and colour of the growth upon potato. One particular form did not liquefy gelatine, and did not give the cholera red, etc. From these differences he believed he was justified in considering the vibrios as belonging to different "species," and on this ground disputed the specificity of Koch's comma bacillus. In his latest paper¹ he describes some new species, and states that those previously isolated do not show any tendency towards reversion to a common form. In some cases of cholera, moreover, Cunningham was unable to find any comma bacilli, and in cases where they were found, the numbers present bore no relation to the intensity of the disease.

Lesage and Macaigne,² from their observations at a Paris hospital in 1892, came to the same conclusions as Cunningham as regards the relation of the vibrio to the disease. In over one-fifth of the cases examined

it was not found, though repeatedly and carefully looked for by modern methods. In no case was it the only microbe present. In three cases diagnosed as cholera, the only microbe present was the bacillus coli communis. When present, the vibrios varied much in size, shape, and curvature, but their behaviour on the ordinary cultivation media was the same as that described by Koch.

E. Fraenkel,³ at Hamburg, in 1892, detected them microscopically in the stools in 442 cases; in 92 cases he could not see them, but in most of these they were found by means of plate cultures: where they could not be cultivated the case was of more than four days' duration. In one fatal case, however, they were found in the intestinal contents on the eighteenth day.

Hueppe,⁴ in the same epidemic, also found that vibrios seen microscopically in the stools could often not be grown on the ordinary media, and in one such fatal case they were afterwards cultivated from the contents of the small intestine: in such cases the vibrios are apparently killed in the large intestine.

From these observations it is seen that the vibrios soon disappear from the stools in some cases, and in other cases are not cultivable from the stools, and thus two sources of fallacy arise when stools alone are available for examination.

Hueppe also noted that the vibrios did not uniformly grow in the ordinary media in the way described by Koch. He also found that by starting from a single colony of vibrios which possessed the characters described by Koch, he could, by artificial cultivation, obtain more vibrionic varieties than he could obtain fresh from the stools. This variability of the vibrio is, in his opinion, so great that Cunningham's "species" are to be considered varieties of one and the same vibrio. Other observers have also arrived at similar conclusions. In a previous paper he had shown that when cultivations of Koch's vibrios were injected into the peritoneal sac of guinea-pigs, the animals died in twenty-four hours as a rule. Pfeiffer further studied this mode of action of the vibrios, and attempted to apply quantitative methods to this intraperitoneal inoculation as a test of the virulence of the vibrio.

Delépine,⁵ in September, 1893, observing that the ratio of liquefaction of undoubted samples of cholera vibrios obtained from the same case, and even on the same plate, presented great variations, was led to reject this phenomenon as a sufficient diagnostic sign for Koch's vibrio, and studied with Richmond the characters of a number of varieties of this microbe.

Koch⁶ now attempted to reduce all these apparently discordant observations into harmony for the purpose of the bacteriological diagnosis of cholera. Microscopically, he said, cholera might be

diagnosed by the arrangement of commas in the mucous flakes. In gelatine plate cultures the colonies appeared at the temperature of 22° in fifteen to twenty hours. In saline peptone water cultivations the vibrios give the cholera-red reaction. Cultivations on agar are pathogenic to guinea-pigs when inoculated intra-peritoneally. When the vibrios are few in the stools, and many other kinds of bacteria are present, the former may not be directly cultivable. To increase their number, the stools are mixed with saline peptone solution and kept at a temperature of 37°C., the vibrios now gather at the surface, and there multiply, so that in six hours they can be readily isolated in plates, but sometimes a further trial of a large quantity of fæces in a large quantity of the peptone solution must be made before the presence of the vibrios can be definitely excluded (Abel and Claussen⁷).

In 1893 Rumpel⁸ found that after the first day's illness the vibrios were not found in thirteen cases; in eight cases they were not found after the second day, in five not after the third day, and in twelve not after the fourth day. On the other hand, on the first day in the first case of definite cholera in Hamburg, in the summer of 1893, no comma bacilli were found in the stools, but many were obtained on plate cultivations on the following days; in another case they were found in the stools up to the fifteenth day, excepting the twelfth day, on which none were found. He used a preliminary peptone cultivation, if no vibrios could be grown directly from the stools.

We see from these examples of the method of working what an amount of work is required to exclude the presence of vibrios from samples of stools where they are present in small amount, and it is easily conceivable that in many cases in which the results of examination for vibrios have been negative, the conclusion has been arrived at after insufficient or, in non-fatal cases, unrepeatable examinations. In a large number of cases presenting symptoms of cholera, after the most careful examination made after death no traces of vibrios have been found. According to the vibrionic theory of Koch this is what might be expected, seeing that such cases arise in various pathological conditions quite apart from Asiatic cholera, and especially at those seasons at which also Asiatic cholera most commonly is epidemic.

In some cases Koch's vibrios have been found in the stools of persons who either had no symptoms of cholera, or had diarrhoea, with or without vomiting and cramps, but without collapse. In two cases Rumpel found them in formed stools. Abel and Claussen examined almost daily the stools of seventeen "isolated" persons who belonged to families in which cases of cholera had occurred. Some of these were in good health, and some had diarrhoea of longer or shorter duration. In no less than 13 were Koch's vibrios found in the stools: they were not found every day, but

were sometimes missed for one or two days. In one case in which no vibrios were found on examination of a stool, the subject was seized the same night with cholera, which was fatal within forty-eight hours, vibrios being then present. Kolle⁹ mentions some cases in which the normal stools were found to contain the vibrios: these persons were then isolated, and in a few days they had moderately severe or mild attacks of cholera, the diarrhoeal stools then containing many of the vibrios. These cases and others in which the vibrios were found in the stools of healthy persons occurred among members of the same families with infected persons at Stettin, in 1893. Assuming the vibrios to be the exciting cause of cholera, it is evident that some persons exposed to their action are, at times, proof against them, and also that this immunity is not due to the killing of all the microbes by the acid contents of the stomach. That this is not in opposition to the epidemiology of cholera is seen in the experience of Dorpat and Ashbourne, where many escaped cholera though they drank of the water which infected others.

The intraperitoneal method of inoculation of Koch's vibrio has received further examination, and it has been shown by various observers (Klein, Sobernheim, Pfeiffer and his pupils, and Hueppe) that other pathogenic microbes, some non-pathogenic microbes, and even unorganised ferments, are capable of producing the same clinical and pathological results when injected into the peritoneal sac. Moreover, animals which have been thus treated, and have recovered, are now found to be capable of resisting a dose of the vibrio or other microbe which proves fatal to normal animals (usually guinea-pigs). The action of the vibrio of Koch is, therefore, not necessarily a specific action either in its pathogenic or in its immunising nature. Pfeiffer now sought for a method by which he could determine whether or not Koch's vibrio possessed any specific action such as could be used for diagnostic purposes. Pfeiffer and Issaëff¹⁰ found that the immunity against peritoneal inoculation of Koch's vibrio, conferred by bacteria of other species, was of a transitory nature, whilst the immunity due to Koch's vibrio was of a more lasting nature. The serum of the blood of animals which are rendered immune to this vibrio by its inoculation, also has the power of rendering a second animal immune to the vibrio when inoculated with it. The serum from animals immunised by other bacteria has no such power, nor has the serum of normal animals. Pfeiffer,¹¹ in a further paper, develops a method by which these properties are applied as practical tests. The serum of a guinea-pig, which was strongly immunised by Koch's vibrio, was injected, in a very small quantity, ascertained by experiment, with such an amount, also ascertained by experiment, of a culture of the same vibrio as would kill animals of a certain weight, and

the mixture was then injected into the peritoneal sac of a normal guinea-pig of the same weight. By small capillary pipettes samples of the exudation were taken out immediately, in ten, twenty, and forty minutes. In the first sample the vibrios were seen to be motionless; in the second fine granular spherules along with motionless vibrios were seen; in the third the spherules only were seen; and in the fourth even these had disappeared. When other kinds of bacteria were inoculated along with this serum in fresh animals, they grew just as they would if injected by themselves. The serum of four persons, who had recovered from cholera, had the same immunising properties and behaved exactly in the same way as the serum of the guinea-pig which had been highly immunised against Koch's vibrio.

The guinea-pig is made highly immune against the vibrio by first injecting cultivations, which have been killed by chloroform vapour, in increasing doses, at such intervals that the animal survives the operations; then by injecting living cultivations in increasing doses, in a similar way, until the animal is capable of withstanding an enormous dose of a virulent cultivation. Such virulent cultivations are obtained by injecting large doses of cultivations of vibrios, which have become weakened, into the peritoneal sacs of guinea-pigs. From the exudation so produced, another guinea-pig is inoculated, and so on through a series, until a very small quantity of exudation, or cultivation on agar, obtained from it, is sufficient to cause the death of a guinea-pig.

In a similar way, animals may be immunised against many other kinds of bacteria; but Pfeiffer found that the serum of these animals did not kill any but the particular bacterium used in the process of immunisation, when injected with them into the peritoneal sacs of normal guinea-pigs. Thus each kind of serum had its specific immunising properties.

If it be desired to test a certain vibrio (V), as to its identity with that of Koch (K), the vibrio V may be injected into the peritoneum of a fresh animal, along with the serum of a guinea-pig, highly immunised against Koch's vibrio (serum K), at the same time another fresh animal receives the same amount of vibrio V, mixed with the same amount of normal guinea-pig's serum. If the latter animal survive it is evident that the vibrio V is too weak to withstand the action of the normal guinea-pig's peritoneum and the action of normal serum. In this case no conclusion could be drawn, unless first the virulence of the vibrio V be increased if possible. Tested in this way numerous samples from various parts of Europe, isolated from the stools of cases of cholera, gave the same reaction as Koch's vibrio. Seven sporadic cases of cholera at Hamburg in the summer of 1893, and cases from the Lisbon epidemic of choleraic-diarrhoea, yielded vibrios which did not answer this test.

These results were confirmed by Dunbar¹³, who found that vibrios, isolated from the stools in cases which clinically and epidemiologically were cases of Asiatic cholera, gave the reaction of Koch's vibrio, although some of the vibrios grew in an atypical manner. [Dunbar also confirms Pfeiffer's statement that bacilli, suspected to be typhoid bacilli, may be tested by the same specific reaction of "typhoid-serum."]

Of late years innumerable examinations have been made of river water, sewage, and drinking water, especially with a view of finding vibrios, with the result that numerous vibrios have been found, some of which resemble more or less closely those of Koch. Dunbar has 150 in his possession from all parts of Europe, some differing very much in character from Koch's vibrio, but none of them such striking differences from that vibrio as he himself has produced by growing a typical specimen of the vibrio for some time in water. Vibrios were found in the sewage of Paris, in the Seine, and in the drinking-water of Versailles by Sanarelli¹⁴ in the summer of 1893, when there was no cholera in Paris or Versailles. The vibrios gave the cholera-red reaction, and were pathogenic to animals. Pfeiffer¹² found that the Versailles vibrio behaved like that of Koch, whilst one of the Seine vibrios gave negative results. He also got negative results with vibrios isolated from the Spree at Berlin, the Oder at Stettin, the Berlin water supply, the Havel at Potsdam. At each of these places there was no case of cholera at the time. The two latter vibrios were pathogenic, and gave the cholera-red reaction. In ten cases where the water either might easily have been polluted with cholera dejecta, or was actually used as drinking water by persons who were attacked by cholera, the vibrios isolated from it gave this reaction.

The most important exceptions to the rule were found in the Mas-sowah vibrio and in some phosphorescent vibrios from Hamburg. The former, although presenting characters different from those of Koch's vibrio in some respects, yet gave the cholera-red reaction, was highly pathogenic, and was found in the stools of cases presenting the characters of cholera; hence it was assumed to be a "true cholera vibrio." The most important phosphorescent vibrio which was excluded was one which was isolated from the stools of a case of cholera at Hamburg. At first the cultivations on agar were, like those of Koch's vibrio, not phosphorescent, but in the course of laboratory life they became phosphorescent. The non-phosphorescent form gave Pfeiffer's reaction. This is particularly interesting, because phosphorescent vibrios were found in the Elbe at Hamburg at a time when only a few sporadic and anomalous cases occurred, and in some of these cases phosphorescent vibrios were found. Most of these water vibrios gave negative results by Pfeiffer's

test, as also the stool vibrios. At a later period of the same year (1893) cases presenting all the characters of cholera occurred at Hamburg, and in these Koch's vibrio was found. This action of the immunising serum is not of a bactericidal nature, pure and simple, for if the serum is diluted very largely, say 100-fold or more, with sterile broth, cholera vibrios can be cultivated in it, yet when a small quantity is injected into a guinea-pig along with Koch's vibrio the reaction is obtained. The co-operation of the living peritoneum is necessary. If the guinea-pig be recently killed and kept at blood heat, the reaction still goes on quite apart from the influence of the blood current.

Sanarelli¹⁵ and Kutscher¹⁶ have made observations which show the possible origin of some of these water vibrios which resemble those found in cholera. It was well known that vibrios occurred in the intestines of guinea-pigs, but they had not been cultivated. Sanarelli found that by first neutralising the contents of a guinea pig's stomach, and then introducing into the stomach or abdomen a dose of cholera poison, with or without simultaneous injection of a dose of typhoid poison, the animal so treated died just as they did when, instead of cholera poison, the living vibrios of cholera were used; and in the intestines of the animals vibrios were found and could be cultivated. These vibrios give the cholera-red reaction, and are pathogenic when tested with guinea-pigs. The action of the cholera toxin is to produce an intestinal lesion which leads to an increase in the virulence of the vibrios normally present in the intestines of animals; hence the vibrios are not killed in the intestines, and can be cultivated from the intestinal contents; such is Sanarelli's view. Kutscher found vibrios having the character of Koch's vibrios in the Lahn below Giessen; he did not find them above. On tracing these back to their source he found that they were derived from farm-yard manure, and the constituent of this which yielded the vibrios were the faeces of pigs. These vibrios were first found at the end of September. There had been no cases of cholera at Giessen for years.

Klein¹⁷ gives the results of the bacteriological examination of samples of stools and intestines from suspicious cases of cholera, 56 in number, from 53 cases. Of these 6 were spoiled by the use of antiseptics, and of the remaining 47 Koch's vibrio was found in 30. He found the vibrios differed from each other in some marked respects—shape, rate of liquefaction of gelatine, formation of scum on broth cultivations, colour of growth on potato. In 15 of the 30 cases he could detect the presence of Koch's vibrio by microscopical examination alone. In the 30 cases epithelial flakes were found in the stools in all. In the 17 cases where Koch's vibrio could not be found, epithelial flakes were found in 4 fatal cases, and flakes composed of leucocytes in 6 cases which recovered, so that epithelial flakes in the stools of a patient having the clinical

signs of cholera must be looked upon as of bad omen. Klein admits the diagnostic value of the presence of Koch's vibrio, at the same time not committing himself as to its ætiological value.

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James Richmond.

BOLTON (MEADE). "The effects of various metals on the growth of certain bacteria."—*International Medical Magazine*, Dec., 1894.

THE author refers to the work of Miller of Berlin, Behring, and Uffelmann, on the same subject, and then describes a series of experiments which he has recently made in the Pathological Laboratory of the Johns Hopkins University.

In these experiments, he followed Miller's methods, using cultures of various micro-organisms, staphylococcus pyogenes aureus, anthrax, cholera and typhoid bacilli, bacillus coli communis, bacillus prodigiosus, and bacillus pyocyaneus. Agar plates were used, a large amount of culture being inoculated into the melted medium. The metals were put on as soon as the plates were made.

The usual effect was the production of a clear space immediately round the piece of metal—a zone of inhibition, and between this and

the normal growth, an intensified zone, varying in width and distinctness, but always narrow in proportion to the clear zone. Eleven figures are given, showing the appearance of the culture plates with these zones. Copper, brass, silver, magnesium, zinc, and iron all showed a clear zone of inhibition, and also an intensified zone of increased growth. In the case of magnesium, gas bubbles were formed, which raised the bit of metal above the medium; with zinc, there was a milky discoloration all round the metal, discoloration being also noticed in the case of iron. Platinum, platinum black, aluminium, silicon, niobium, and also charcoal failed to give any reaction. Gold showed no inhibition with *staphylococcus pyogenes aureus*, *bacillus coli communis*, typhoid bacillus, or cholera bacillus. In some cases, there was inhibition of growth of anthrax cultures, when the gold had not been recently "glowed."

Pure cadmium gave strikingly different reactions with different micro-organisms. With *staphylococcus pyogenes aureus* there was a clear zone, varying in width, but no markedly intensified zone. With the *bacillus coli communis* the clear zone was surrounded by a very markedly intensified zone, almost as wide as the clear zone. With typhoid bacillus a clear zone, then a faintly intensified zone about half the breadth. The most peculiar reaction obtained in all the experiments was one with cadmium and anthrax cultures. In this case a perfectly clear zone, 5 mm. wide, was surrounded by an intensified zone, 2mm. wide, and beyond that a second inhibitory clear zone, about 1 mm. wide. In some plates the second inhibitory zone was not entirely free from colonies, but it could always be made out distinctly.

Mercury also exhibited considerable differences in its reactions with various organisms, the most striking being in the case of the typhoid bacillus, where the intensified zone was more or less double, a narrow, almost clear, zone running all round and dividing the intensified area into two zones. The *bacillus coli communis* gave a broad, clear zone, then an intensified zone, shading off on the outside. Though a good many experiments were made with concordant results, the author does not consider, however, that it would be safe to regard these reactions as characteristic until a greater number of tests have been made.

Antimony with *staphylococcus pyogenes aureus* gives a clear, sharp zone, about 1 cm. broad, and then a zone of about 5 mm. with diminished growth. With the *bacillus coli* there is an inhibitory zone, 8 mm., with diminished growth, but no clear zone. The intensified zone is quite distinct, and about 1 mm. broad. The typhoid bacillus gave a somewhat similar reaction. Anthrax gave a very wide clear zone, 1.8 cm., and an indistinct intensified zone. With the cholera bacillus there was no sharply marked clear zone, but diminished growth could be made out as far as 1.5 cm. to 2 cm. round the metal. Bismuth with *staphylococcus*

pyogenes aureus gave a clear zone about 2 mm. wide, and an indistinct, narrow, intensified zone. With anthrax cultures there was a clear zone 1 mm. wide. *Bacillus pyocyaneus*, *bacillus coli communis*, cholera and typhoid bacilli gave no reaction with bismuth. Pure nickel failed to give any reaction with most of the micro-organisms tested. There was a clear zone with an anthrax culture.

Dr. Bolton points out that evidently some metals have no marked effect on the growth of the bacteria tested, and it is precisely the metals which are resistant to chemical agents that fail to react, whilst those metals which are readily attacked by chemical reagents exhibit a marked inhibitory action on the growth of the bacteria. The effect may be due to a solution of the metal in the medium, and traces of the metal have been detected by chemical tests in the nutrient medium surrounding the metal. The explanation of the intensified zone is more difficult. Dr. Bolton suggests two theories, but he makes no attempt to explain the second inhibitory zone.

The length of time of contact of metal with the agar in order to develop the inhibitory action, was tried with brass, copper, cadmium, and zinc. With cadmium, a clear space was evident after about a minute; with zinc, the time was about the same; with brass and copper there was no clear space till the metal had been on for more than fifty minutes.

Francis J. H. Coult.

Reviews.

"Forty-fifth Annual Report upon the Health of Leicester." By JOSEPH PRIESTLEY, B.A., M.D., Medical Officer of Health. Leicester: G. Palmer, 1895.

DR. PRIESTLEY'S report is specially instructive, owing to an admirable summary which it contains on the subject of workshops. It appears therefrom that there are in the Borough of Leicester as many as 234 workshops with 500 rooms in connection with 26 trades or businesses. In these workshops there are 2,919 employees, of which 1,779 are males and 1,140 females. It is remarkable that Dr. Priestley found only 47 work-rooms, or 9.4 per cent of the whole number, overcrowded; but it is very interesting to note that the businesses, in which the chief amount of overcrowding was to be found, were "boot and shoe," "dressmaking,"

"millinery," and "hosiery." These facts, although probably better than in other towns, naturally point to the necessity for continued strict supervision of workshops in the borough. In respect of the sanitary condition of the workshops themselves, Dr. Priestley states that, "of the 234 workshops visited and inspected, 115 were found to be in a good sanitary condition, whilst in the case of 119 sanitary defects were found," and that of these defective workshops, "111 (i.e., 22.2 per cent) were unsatisfactory as regards cleanliness, 9 (i.e., 1.8 per cent) were unsatisfactory as regards ventilation." Only 9 of the whole number of workshops were found to be without any closet accommodation whatever. The report also contains some admirable suggestions for the guidance of teachers in public elementary schools in respect of cases of infectious diseases among scholars, and in many other respects shows marked signs of sound sanitary work being in progress in the borough.

"Text-Book of Diseases of the Kidneys and Urinary Organs." By Professor PAUL FÜRBRINGER, Berlin. Translated from the German, with Annotations by W. H. GILBERT, M.D., Baden-Baden, with Commendatory Letter from SIR THOMAS GRAINGER STEWART, M.D. In two volumes. Vol. I. London: H. K. Lewis, 1895.

No one will regret the perusal of Professor Fürbringer's book on renal disease, but the form in which it is now presented to English readers is far from faultless. The unusual purity of language found in our English classics on this subject perhaps makes us unduly sensitive to the frequent recurrence of German idioms, or the use of words in a very strained sense. In Dr. Gilbert's translation some sentences can hardly be said to have emerged from the original German, others are obscure in their meaning. In spite of these drawbacks, the book is one to be read. We do not recommend the student to begin with Professor Fürbringer, but having mastered one of the English classics, and thus obtained an adequate presentation of the subject viewed from the positive pole, he may pass with advantage to the otherwise confusing crowd of pathological possibilities and conflicting researches so ably marshalled by the German expert. From the English work he will rise, congratulating himself on his knowledge; from the German, astonished at the number of important questions as yet undecided. It is this very characteristic that makes its perusal so useful. Every section suggests fresh thoughts, and opens out new lines of investigation. The subject discussed in this first volume is practically Bright's disease. Preliminary paragraphs are devoted to albuminuria, hæmaturia, hæmoglobinuria, renal casts, dropsy, uræmia. Professor Fürbringer then deals with the circulatory disturbances of the

kidneys found in Asiatic cholera, pregnancy, venous congestion, and hæmorrhagic infarct, while the remaining two-thirds of the book is given to acute and chronic nephritis, including amyloid and suppurative changes. A detailed examination is out of the question, as almost every page calls for comment. As Sir T. Grainger Stewart remarks in his short introductory letter, it would not be difficult to point out many statements which diverge widely from those generally accepted in this country. For instance, it is at first startling to read "that in spite of minute investigations and accurate observations, we have never found a case of acute morbus Brightii, the origin of which could be positively attributed only to cold." Here it would be almost regarded as a libel on Manchester weather. Nevertheless, it suggests a fresh examination of things sometimes too readily taken for granted, and leads the reader to institute a more careful search for other etiological factors, including those toxic influences, the importance of which Professor Fürbringer does not under-rate. We are, however, much impressed by the true scientific spirit of judicious caution shown by the author. It is neither too ready to form an opinion, nor too conservative to alter one. The candid way in which he acknowledges a change of view, based on further experience, makes us attach considerable weight to those conclusions which he has definitely formulated. Most English observers will agree with him in ignoring the evil influence attributed to organic potash salts in uræmia; in the statement that, apart from certain glomerular changes, "weakness of the heart is very often the chief cause (? cause) of anuria and dropsy, a fact not generally believed, and we cannot recommend physicians too strongly to use digitalis carefully. This remedy has produced, according to our opinion, the best results;" and also for the conviction, that the search for reagents more sensitive to the presence of albumen than those already in use, is a mistake, and the italicised advice—"on the contrary, practitioners should adopt, as much as possible, the old and reliable procedure of testing for albumen, should not trouble themselves about small unimportant hazes, but should only reckon with decided deposits which, even at first sight, show their importance. Each year of practical clinical experience impresses us more with the importance of this rule."

As far as we can judge, Professor Fürbringer has done full justice to English observers, with, perhaps, one exception. In the absence of an index, indeed, we hesitate to assert the omission. Should an index be provided with the second volume, it might with advantage be appended to the first in future issues, as the latter appeals to the physician, and the former chiefly to the surgeon. Another very useful addition would be the quotation of the page when reference is made from one part of the volume to another. We thank Dr. Gilbert for introducing this book to the profession in England, and also for his interesting notes.

"Note-Book of Materia Medica, Pharmacology, and Therapeutics." By R. E. SCORESBY-JACKSON, M.D., F.R.S.E. Fifth Edition, 1895. Revised by J. RUTHERFORD HILL and RALPH STOCKMAN, M.D., F.R.C.P.E. Edinburgh : James Thin ; London : Simpkin, Marshall, & Co.

THE last edition of Dr. Scoresby-Jackson's "Note-Book" appeared in 1880, and the book is almost unknown to the present generation of medical students, as it has never been adapted to the "Pharmacopœia" of 1885. The present issue is, therefore, particularly welcome, as it retains all those features which distinguished the earlier editions from other works of a similar scope, and rendered it deservedly popular with students of Materia Medica, whether medical or pharmaceutical. To revive a book which has been so long in abeyance is always a difficult task, and the present editors have had their difficulties increased by the fact that the first portion was already in print, having been revised several years ago by the late Dr. Moinet. The chief features which call for attention are, firstly, the large amount of space devoted to general pharmaceutical topics, these contain much information not usually included in the bald definitions of most modern text-books of Materia Medica, and certainly make the subject more interesting ; secondly, the inclusion of a very large number of non-official drugs ; thirdly, the full descriptions of the characters of vegetable drugs and of their common adulterations and substitutions. These points render the book particularly suitable for pharmaceutical students, but at the same time make it a valuable text-book for medical men and students who take an intelligent interest in the subject, and desire to extend their knowledge beyond the minimum necessary to pass an examination. The pharmacological and therapeutical portion is concise, but includes all important information. The latter part of the book is, owing to the circumstances of the revision, better up to date than the earlier. A few minor inaccuracies may easily be pointed out ; but even in its present form it can be strongly recommended as a reliable text-book, and we may look forward to the next edition, in which the revisers will have a freer hand, as promising one of the best text-books on Materia Medica in this country. The printing, paper, and general style of the book leave nothing to be desired.

"The Extra Pharmacopœia." By WILLIAM MARTINDALE, F.C.S., and W. WYNN WESTCOTT, M.B.Lond. Eighth Edition, 1895. London : W. K. Lewis.

THREE years have elapsed since the seventh edition of the "Extra Pharmacopœia" was published; and the eighth, which is now before us,

represents very fully the work which has been done in the interval. Since the last edition, new Pharmacopœias have been published in the United States, Italy, Switzerland, Denmark, and Japan, and also Supplements to the German Pharmacopœia and to the French Codex. These have been collated, and many of the new preparations inserted or noted. Another new feature is the introduction of two special chapters on the recently introduced "Antitoxins" and the preparations made from animal glands and tissues.

The Introduction contains an interesting article on the revision of the "British Pharmacopœia," which is well worthy of perusal. And though we may differ from the author as to the expediency of certain changes which he advocates, there is no doubt as to their suitability for consideration by the Pharmacopœia Committee. This article concludes with a summary of the analysis of 25,500 prescriptions recently dispensed in all parts of the Empire, and affords useful information as to the general run of practice among physicians educated on our own lines. Any detailed criticism of such a well-recognised and indispensable book is superfluous; we can only congratulate the authors upon its continued success, and add that it fully deserves it.

"Infancy and Infant-rearing: An Introductory Manual." By J. B. HELLIER, M.D.Lond. London: Charles Griffin and Co., 1895.

THIS little book is calculated to be of great service to nurses and students—those for whom it is intended—and, indeed, it is such an ably-written and carefully-arranged compilation of information concerning the rearing of infants, that it may well prove useful to practitioners of considerable experience. Perhaps the array of facts may confuse somewhat the average nurse on a first reading, but there can be no doubt that if she will take the trouble to thoroughly master them, she will be in a far better position for fulfilling her duties on a scientific basis than she could hope to occupy even after many years of experience alone. We can cordially recommend the book as a sound and reliable guide.

"The Circulation of the Blood." By WM. HARVEY.

THIS is a fac-simile reprint (privately reproduced) from the original edition of Harvey's "De Motu Cordis," which was printed at Frankfort-on-the-Maine, in 1628. To it is added a translation and memoir for G. Moreton, 42, Burgate Street, Canterbury, 1894. The edition is beautifully got up, and there is added a photogravure of Harvey from the portrait in the National Gallery. We are glad to notice that Harvey's birth-

day is correctly given, viz. 1st April. The late Professor Sharpey used to say that as to his natal day he always felt in good company, for were not Harvey and Bismarck born on that day. The reproduction must be regarded rather as a labour of love than as a work of necessity, for in Robert Willis's translation from the original Latin for the New Sydenham Society one has all that can be desired. Moreover, the Sydenham Society edition contains a fuller account of Harvey's life. The present translation differs somewhat from that of Willis. We congratulate the publisher on the production of so elegant a volume. It is rather remarkable that Harvey's immortal work was not translated into French until 1879, when Ch. Richet, the present Professor of Physiology in the Medical School of Paris, undertook the task as a labour of love.

"The Theory of Physical Education in Elementary Schools." By THOMAS CHESTERTON, Organising Teacher of Physical Education to the London School Board. With a preface by Colonel G. M. ONSLOW. London: Gale and Polden, 1895.

OUR foremost duty to the child demands the establishment, maintenance, and development of its physical nature. A healthy body is the essential basis for a vigorous mind. Educationalists, however, appear to be only just commencing to realise that the education of a child's mental and physical faculties should be closely associated in the methods of instruction adopted in so-called elementary schools.

Arrangements have just been made whereby it will become compulsory on all elementary school managers to make due provision for the instruction of their children in "Swedish or other drill, or other suitable physical exercises."

The author has compiled his little work "with a view of placing in the hands of school teachers and college students a brief outline of all that is absolutely necessary for them to study in order to pass an examination in the theory of physical education with reference to school children."

A large section of the volume consists of a somewhat dreary description of certain anatomical points, with sundry references to elementary physiological facts. No illustrations brighten the pages. The numerous admirable volumes on elementary anatomy and physiology now available to teachers, would, we should have thought, have rendered such a portion of the book quite unnecessary.

The chapters in which the forms, effects, and methods of exercise are dealt with contain much that is suggestive and useful.

Musical accompaniment is recommended for such physical exercises as require regularity of movement, and which can be performed almost automatically. We are glad to see that vocal effort during the performance of physical exercises, especially those demanding vigorous movement, is strongly condemned.

Mr. C. Roberts, F.R.C.S., contributes an interesting section on "Singing and Declamation."

Notwithstanding the numerous works now before the public with reference to physical education, there will doubtless, as the author suggests, be found space for this little guide to the theory of the subject, particularly with reference to the physical education of school children.

"Report of the Council of the Dublin Sanitary Association, etc., 1894."

Dublin : John Falconer, 53, Upper Sackville Street.

THE establishment in large communities of voluntary sanitary associations, acting independently of, but not in antagonism to, local sanitary authorities, is certainly to be commended. Such associations may do a large amount of good, not merely in the stimulation of local governing bodies to meet the needs of their ratepayers, but equally as much in teaching those same contributors to the public purse to see to the care of their own dwellings and the avoidance of such things within and around their premises as are likely to prove injurious to health. To excite a reasonable interest in sanitary matters, and to guide that sentiment aright, ought to be one of the most laudable objects of such institutions. The Report of the Council of the Dublin Sanitary Association for the year 1894 may fairly be said to show that the accomplishment of such good work has been aimed at, and not the least effective part of the pamphlet which the Council has issued is the appended address of the President of the Association, Dr. J. W. Moore. It is sensible, interesting, and instructive, and should do much to stir up the people of Dublin to the sanitary needs of their city.

"The Treatment and Education of Mentally Feeble Children." By FLETCHER BEACH, M.B., F.R.C.P. London : J. & A. Churchill, 1895.

THIS little book of 32 pages of large print and wide margins contains an extremely sketchy account of mentally feeble children and their treatment. The first 14 pages are devoted to a very short description of idiots and imbeciles, and the remaining 18 pages to the treatment, considered under the heads—"Attention to hygienic conditions ;" "Adapta-

tion of the principles of medicine to the infirmities which exist in this class of patients ;" "Improvements of the physical defects and imperfections ;" "Education and training of the moral and intellectual faculties." Dr. Beach agrees with Bourneville that craniectomy is not of the slightest use for microcephalic idiocy, and points out the value of thyroid extract in cretinoid idiocy. In the last part of the book there is a short description of the various methods of physical and mental training carried on in idiot asylums.

"The Diseases and Deformities of the Fœtus: An Attempt towards a System of Ante-Natal Pathology. Vol. II. Congenital Diseases of the Subcutaneous Tissue and Skin." By J. W. BALLANTYNE. Edinburgh: Oliver and Boyd.

THE second volume of Dr. Ballantyne's systematic work on ante-natal pathology is a worthy successor to the first, and represents a vast amount of labour. We are not surprised that with such a thorough and detailed mode of treatment he finds that to complete his task will lead him beyond his original estimate of time and space, and we are glad that he is not deterred from carrying out his projected work on the ampler scale.

The first quarter of this volume is devoted to the consideration of that interesting disease sclerema neonatorum, rare in Great Britain but much more frequent in France and Italy. Sclerema, says the author, is to be distinguished from œdema neonatorum, which is a separate condition, due to visceral disease. Nevertheless this distinction is sometimes hard to make, for an œdematous condition may be associated with sclerema; and in fact sclerema and œdema may co-exist in the same subject. The clinical features of this condition are well discussed, the most characteristic being the corpse-like coldness of the skin, the reduced bodily temperature, the small weight and impaired nutrition, and the slowness of pulse and respiration. In discussing the etiology, and the various theories advanced to account for the disease, the author shows that the syphilitic theory is not tenable, and that there is a good deal to be said for the view that it is caused by a lesion of the thermic centres. He says: "I believe that in most cases the morbid process, resulting in sclerema, is initiated in utero, that the most important factor in its pathogenesis is an ante-natal lesion of the nervous system, possibly of the thermic centres, and that cutaneous chilling is only one of the several conditions that may serve to develop the malady when it is not already present at birth."

A third of this volume is devoted to ichthyosis in its various forms. The grave form of foetal ichthyosis develops from about the fourth month

of foetal life, and leads to the death of the child soon after birth. This truly hideous condition is well described and illustrated. The author shows that an intermediate attenuated form connects this with ordinary ichthyosis. Later on we have an interesting account of keratolysis of the foetus and new born, which, with the other conditions more briefly treated of, will well repay perusal. Dr. Ballantyne is producing the best English work of reference on this branch of study.

PUBLICATIONS RECEIVED.

From Wright & Co., Bristol :—

"The Eye in its relation to Health." (6s. 6d.) By CHALMER PRENTICE, M.D.

From Griffin & Co., London :—

"Essays on Heart and Lung Disease." By ARTHUR FOXWELL, M.A., M.D. Cantab.

From A. and C. Black, London :—

"Text-book of Operative Surgery." (20s.) Second Edition. By Dr. THEODOR KOCHER. Translated by HAROLD J. STILES, M.B., F.R.C.S. Edin.

From The Scientific Press, London :—

"Hospital and Charities Annual." (5s.) By HENRY C. BURDETT.

From H. K. Lewis, London :—

"Hygiene and Public Health." Fourth Edition. (10s. 6d.) By LOUIS C. PARKES, M.D., D.P.H.

Obituary.

WILLIAM CRAWFORD WILLIAMSON, LL.D., M.R.C.S., F.R.S.

IN Professor William Crawford Williamson, LL.D., F.R.S., who died at Clapham on Sunday, June 23rd last, the Owens College loses the senior in age (unless we mistake) among its *emeriti* professors, and one who was associated with its history from its very earliest days. Mr. Williamson, who was born at Scarborough in 1816, came to Manchester when quite a young man as curator of the Manchester Natural History Museum, and soon achieved a scientific reputation for himself by his researches in both geological and botanical science, to which latter he had been early led by family associations. In 1841 he also began practice as a medical man, and from 1855 to 1865 acted as surgeon to the

Ear Hospital, in the foundation of which he had taken a special interest. When in 1851 the Owens College was founded, Mr. Williamson was placed in charge of the teaching of Geology and of Biology in both its branches, nor was it until 1872 that Geology, and till 1879 that Zoology, were separated off from his Chair. Botany he continued to teach so long as he remained connected with the College; and it was in connection with this science, and more especially with Palæobotany, that he reached a position of the highest authority far beyond the limits of his own country. He had been a F.R.S. since 1854; and twenty years later the Royal Society conferred on him a Royal Medal for his series of memoirs on the carboniferous plants of Lancashire and Yorkshire, illustrated by a series of exquisite drawings from his own hand. In 1880 he was awarded the Wollaston Gold Medal of the Geological Society, and in 1883 received the honorary degree of LL.D. from the University of Edinburgh. He was for many years an active member of the Manchester Literary and Philosophical Society, whose presidential chair he occupied in 1884-5.

When in 1882 Professor Williamson resigned his Chair at Owens College and in the Victoria University, he seemed to have still many years before him of the scientific labours in favour of which he had gradually relinquished the practice of the medical profession. The period which, as it proved, was given him to spend in the tranquil retirement of Clapham was full of intellectual activity, not unproductive of valuable fruit; and he was almost to the last frequently to be seen among his favourite associates at Burlington House. In the days of his later as well as of his earlier manhood, he had few equals in power of continuous hard work, for which he was braced by habits of rare self-denial. He was at the same time a most genial companion, and gifted with a natural eloquence which made him one of the most successful of the popular scientific lecturers of his day. His loss will be mourned by many old Manchester men in whose circle he was a familiar figure, by the College of which he was an ornament for more than forty years, and by a large number of students to whom he communicated something of his own indefatigable enthusiasm in the study of Nature.

Local News.

THE INFIRMARY.

At a meeting of the Trustees of the Manchester Royal Infirmary, held on the 26th of March last, it was decided to refer the question as to the method by which the Infirmary accommodation should be increased to a

Grand Committee, consisting of the Board and an equal number of Trustees who are not members of the Board. The Lord Mayor of Manchester, the President of the Chamber of Commerce, and the Chairman of the Manchester Royal Infirmary, were requested to nominate the members of the committee not on the Infirmary Board. The Committee has now been constituted, and has held several meetings. At the last meeting, held on the 17th of June, several suggestions were considered as to the means by which the object for which the Committee has been formed could be carried out. It was finally determined to appoint a sub-committee of ten, five of whom should be members of the Board, to take these suggestions into consideration, and also all other schemes for achieving the object in view. The report of the sub-committee when ready will be laid before the General Committee.

THE OWENS COLLEGE.

THE SCHORLEMMER LABORATORY FOR ORGANIC CHEMISTRY.—The new buildings in the Chemical Department recently opened by Mr. Ludwig Mond, include the Schorlemmer Laboratory for Organic Chemistry, together with a large laboratory for medical students and a room for the preparation and storeage of reagents. After the death of the late Professor Schorlemmer, a meeting of his friends and pupils was held in the Owens College, under the presidency of Sir Henry Roscoe, with a view to obtaining some opinion as to the most suitable way in which his services to the College and to the advancement of organic chemistry could be most fittingly commemorated. It was generally felt that the best memorial would be the erection of a laboratory for Organic Chemistry to be called after his name. A subscription list (generously headed by Mr. Ludwig Mond) was accordingly opened, and the appeal was so well responded to, both in this country and in Germany, that in a short time the sum of £2,500 was subscribed. Meantime the Council of the College had to take into serious consideration the rapid growth of the chemical department. Originally designed for one hundred students, the laboratories had for several years been overcrowded, and the private rooms built for research-work had to be given up for the general instruction of students. The following figures show at a glance this rapid increase during the past five years:—

Session.								Number of students in Chemical Laboratories.
1890-1	...	...	...	...	...	...	...	120
1891-2	...	...	...	...	...	...	...	157
1892-3	...	...	...	...	...	...	...	180
1893-4	...	...	...	...	...	...	...	198
1894-5	...	...	...	...	...	...	...	205*

* Entries up to May 1st.

In view of this steady increase in numbers, the Council became convinced of the necessity of extending the Chemical Department. They accordingly accepted the fund raised by the Schorlemmer Memorial Committee, and instructed Mr. Alfred Waterhouse, R.A., to prepare plans for a "Schorlemmer" Organic Laboratory, and for a new laboratory for elementary students, on a plot of land adjoining the present laboratories acquired by the College for the purpose of their extension. The Schorlemmer Laboratory, designed by Mr. Waterhouse, is at the end of the main corridor in the old chemical building. It measures 60ft. by 30ft., and has an arched roof 30ft. high. The laboratory is designed to accommodate a Professor, two Demonstrators, and thirty-six students. The working benches have teak tops. Along the length of each bench a deep lead-lined gutter extends, falling at each end to an earthenware sink. Above the gutter the water-pipe is arranged with taps at intervals. The central gutter forms a convenient drain for all "condenser" water, and for all liquids which may be spilt on the bench. All the maindrains are semi-circular troughs laid in asphalt in the concrete floor. They are covered with moveable boards, which permit of easy access to the whole system. The gutter and drains are thus arranged like those in the Munich organic laboratories. In one other particular the Schorlemmer Laboratory resembles those of Munich. The lower portion of each large window is enclosed by a draught cupboard, fitted with two flues leading to the main chimney. Gas jets are also provided in each flue. Eight large draught cupboards, 6ft. 6in. by 2ft., are thus available, and there are, in addition, two other recesses, 8ft. long, provided with flues. One end of the laboratory is occupied by a slate table, 30ft. long, covered with a ventilating hood and backed with glazed tiles, for the purpose of carrying out organic combustions. The whole laboratory is ventilated by a flue in the roof communicating with the main chimney, the fresh air being admitted by adjustable gratings, so as to pass between the hot-water pipes. The lower laboratory is designed for 45 students. The fittings are similar to those in the old laboratories designed by Sir Henry Roscoe. The reagent room, 20ft. by 20ft., communicates by a flight of steps with Burlington Street. The total cost of the new building is £4,800.

Dr. S. J. HICKSON, who succeeded the late Dr. Marshall as Professor of Zoology and Comparative Anatomy in the Owens College, has been elected a Fellow of the Royal Society.

Professor YOUNG and Professor STIRLING have been re-appointed as Examiners, in Anatomy and Physiology respectively, by the Royal College of Surgeons of England.

Mr. F. J. H. COURTS, M.B., Ch.B.Vict., has been awarded an Honorary Research Fellowship in Pharmacology.

HENRY PAYNE, M.D., M.R.C.S., a former student of the Owens College, has been appointed Honorary Medical Officer to the Ashton-under-Lyne District Infirmary.

W. B. WARRINGTON, M.B.Lond., has been admitted a member of the Royal College of Physicians of London.

P. R. COOPER, M.B., Ch.B.Vict., has obtained the Fellowship of the Royal College of Surgeons.

The following students of the Owens College have obtained the diploma of M.R.C.S. and L.R.C.P. under the regulations of the Conjoint Board :—J. T. BARRITT, H. K. BIRLEY, W. W. CLEMESHA, B. E. EDGE, R. J. WARRINGTON, T. L. WEBSTER.

VICTORIA UNIVERSITY.

An interesting ceremony was witnessed in the Chemical Theatre of the Owens College on the 29th of May, when the Victoria University, for the first time in its history, conferred a number of honorary degrees. Among other recipients was Professor D. J. LEECH, Chairman of Convocation, who received the degree of Doctor of Science.

The following gentlemen have obtained the degree of Doctor of Medicine, viz. :—A. J. EDWARDS, M.B.—Dissertation on “Disseminated Sclerosis”; W. J. KERR, M.B.—Dissertation on “The Effects of Alcohol on the Liver”; FRANK ROBINSON, M.B.—Dissertation on “A Clinical Record of 200 Cases of Smallpox”; W. W. STOREY, M.B.—Dissertation on “Ophthalmic Goffre”; R. T. TURNER, M.B.—Dissertation on “Infantile Paralysis resulting from Cerebral Disease.”

UNIVERSITY COLLEGE, LIVERPOOL.

FAREWELL DINNER TO PROFESSOR GOTCH.—On Friday evening, June 21, Professor F. Gotch, F.R.S., was entertained at a Complimentary Dinner held at the Adelphi Hotel, Liverpool, by his colleagues and friends, to celebrate his election to the Waynflete Chair of Physiology at the University of Oxford. Principal Rendall occupied the Chair, and there was a large attendance.

Among the recently appointed residents in the Liverpool Royal Infirmary are the following graduates of the Victoria University :—H. Armstrong, M.B., Ch.B., and S. T. Ross, house surgeons; and R. E. Bickerton, M.B., Ch.B., house physician.

THE MEDICAL CHRONICLE:

A MONTHLY RECORD OF THE

Progress of Medical Science.



PANCREATIC DIABETES IN ANIMALS AND MAN.

By VAUGHAN HARLEY, M.D., M.R.C.P.

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London.

DIABETES MELLITUS, though originally thought to be due to only one diseased condition, is now no longer regarded as a pathological entity, but as a mere symptom of many diseased conditions. In the same way as we have functional albuminurias and various forms of Bright's disease, so we also have transient glycosurias as well as grave forms of diabetes mellitus; which may be due either to nerve lesions or disease of the liver or of the pancreas.

The presence of glycosuria is, at present, only regarded as a sign of a morbid condition requiring further investigation, the pathological cause of which has to be diagnosed before either commencing the treatment or giving a prognosis of the case.

Diabetes mellitus due to disease or destruction of the pancreas is alone the subject to be discussed in the following paper.

Cases of diabetes in which the pancreas was found diseased were described so long ago as 1778, by Dr. Thomas Cawley, under the title of "A peculiar case of diabetes." Bouchardat¹ was one of the first to consider that all cases of diabetes owed their origin to pancreatic disease. Lancereaux,² by adopting Dr. George Harley's division of diabetes into the two forms, of diabetes arising from excessive

¹ BOUCHARDAT. "De la glycosurie et diabète sucre."—Paris, 1895.

² LANCEREAUX. *Bull. de l'Académie de Médecine*. Second Series. 1877. Lapiere, in a thesis "Sur le diabète maigre dans ses rapports avec les altérations du pancréas" (Paris, 1879), published several cases in support of the view of Lancereaux.

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sugar production, and diabetes arising from diminished sugar assimilation,* divided cases into a "diabète maigre" and a "diabète gras." He considered that the former always owed its origin to pancreatic disease, while the latter might have some other cause. Before describing the diseases of the pancreas, in which diabetes is found, and its symptoms, it is as well to give the experimental evidence that pancreatic lesions may be the cause of the diabetes in animals. The old experiments of Schiff and Claude Bernard may be left out of consideration, as the results they obtained, after supposed total removal of the pancreas, are, with our present knowledge, only explained by the fact that some parts of the gland were left.

The experimental evidence verifying a pancreatic form of diabetes only dates back to 1889. The priority of the discovery is disputed between the Italian de Dominicis, who gave a thesis on the subject in April, 1889, and the Germans, von Mering and Minkowski, whose first paper appeared in June, 1889. To the Germans, at any rate, is certainly due the credit of pointing out that when the pancreas was entirely removed from dogs, diabetes invariably followed.

In thirty-four dogs, de Dominicis³ removed the entire pancreas; thirteen of these never had any diabetes even when they lived two, three, or even eight months after the operation. On the other hand, of the twenty-one dogs in which sugar occurred in the urine, he found that it did not appear at any definite period. In some in twenty-four hours, and in others in two, three, or five days respectively. In one case even it only appeared after twenty-eight days. These experiments, as will be seen from later evidence, seem rather to show that he did not always entirely remove the pancreas, and that in those cases in which it took a long time before the sugar appeared in the urine, this was due to the fact that the remains of gland tissue left had become degenerated; while in the cases in which none occurred, sufficient gland tissue remained in a comparatively normal condition, to avert the diabetes.

The experiments of von Mering and Minkowski⁴, however, showed that in all the cases in which the pancreas was entirely removed, sugar invariably appeared in the urine, and, as a general rule, within twenty-four hours after the operation; while in a case where a part of the gland was left behind, sugar did not make its appearance in the urine, although the animal suffered from loss of flesh and the various other symptoms which accompany total extirpation of the pancreas.

* *Medical Times and Gazette*, 1865, and "Diabetes: Its Various Forms and Different Treatments." London, 1866.

³ DE DOMINICIS, *Med. Wochensh.*, 1891, p. 717.

⁴ VON MERING and MINKOWSKI. *Cent. f. klin. Med.*, 1889, Vol. XXIII.; and the full paper in *Arch. f. exp. Path. u. Pharm.*, Vol. XXVI, p. 371, 1890.

The views of the latter experimenters must be regarded as the correct ones, since they have been confirmed during the last three years by Hédou, Lépine, Lancereaux, Gley, Vaughan Harley, Sandmeyer, Capparelli, and others.

The early objections put forward to the view that the total removal of the pancreas was not itself the cause of diabetes, but that it was owing* to some injury in its neighbourhood due to the operation, appear entirely groundless. The pancreas of a dog consists of a perpendicular portion, which is closely adherent to the duodenum for a short distance, and then leaves it to lie quite loosely in the mesentery. The other end again follows the stomach, and then dips deep down in a mesentery of its own. The vessels that supply the horizontal portion are derived from the splenic, those to the other portion come from the pancreaticoduodenal. Von Mering and Minkowski² found that on removing one portion of the gland and detaching the other portion, if its blood supply was left intact, no diabetes followed; while, if at a later time the remaining portion of the pancreas was removed, diabetes immediately occurred. The still more recent experiments of Minkowski are more conclusive, for he has found that when a portion of the pancreas is transplanted into the abdominal wall, and the rest of the gland is removed, no sugar appears in the urine; while if at a later date the transplanted portion in the abdominal wall is removed, glycosuria then follows.

These experiments of Minkowski seem to render the explanation of the brothers Cavazzani³, who endeavoured to prove that the diabetes following the removal of the pancreas was due to nerve injury in its neighbourhood acting on the liver, untenable.

The fact of only a small portion of the gland being left (I have found even a sixteenth), although it may have no duct opening into the intestines, is sufficient to cause the absence of sugar from the urine. It may be concluded, therefore, that the original statement of von Mering and Minkowski, in which they say that only when the entire gland is removed does diabetes occur, has by numerous experiments been proved to be correct.

The symptoms following the complete removal of the pancreas in animals are so similar to those which accompany the disease in man that it will be well to describe them somewhat fully, as by remembering them we are able to make our diagnosis in the human subject.

The symptoms described by various observers, and which I have repeatedly had the opportunity of verifying, are due, first, to the stoppage

* MINKOWSKI. *Berlin klin Wochenschr.*, 1892.

³ CAVAZZANI. "Le Funzioni del Pancreas," etc. Venice, 1892.

of pancreatic secretion reaching the alimentary tract, and, secondly, to some as yet unknown cause, leading to the appearance of sugar in the urine.

After complete removal of the pancreas in dogs, sugar appears in the urine in from six to twenty-four hours, and the maximum amount of sugar is generally reached in about 48 hours. In some cases it may take from five to seven days, and during this period it has a tendency to fluctuate. A well-fed dog excretes from 50 to 200 grams of sugar in its urine per diem, while in dogs kept fasting during five or six days it is not at all uncommon to find only from 50 to 60 grams excreted in their urine. The percentage of sugar is never very high, being usually from 1 to 3 per cent, although it may in rare cases be 10 or 12 per cent; and it is markedly influenced by diet. Hédon and Gley describe periods during which the sugar disappears from the urine without any apparent cause. I narrated the case of a rabbit, in which the pancreas had been destroyed by the thermo-cautery, where the sugar disappeared from the urine in spite of the gland having been entirely destroyed.⁷

The quantity of sugar in the urine is not at all constant, and if any inflammation, such as peritonitis, pneumonia, etc., sets in, sugar, as a rule, disappears from the urine. It is a common thing to notice in dogs one or two days before their death that the sugar disappeared from the urine; and that this disappearance of the sugar from the urine almost invariably occurs before a dog becomes comatose. In fact, in cases where the sugar disappears from the urine and there is no inflammatory condition present to account for it, one may, as a rule, predict coma.

The quantity of nitrogen daily eliminated in the urine is always very large in proportion to the quantity of nitrogen taken in the diet. This is accompanied by a rapid wasting, and is explained by the breaking down of the tissue proteids. Acetone appears usually in the urine after a few days, and is, as a rule, accompanied by the appearance of acetoacetic acid. Von Mering and Minkowski state that before death *β*-oxybutyric acid appears in the urine. This, as far as I can personally speak, only occurs in those cases in which coma is about to supervene.

Albumen is commonly present in the urine, but never in any large quantity, and is rarely accompanied with casts.

Sandmeyer states that bile pigment also sometimes occurs. This I have never found.

Polydipsia is a frequent symptom, but it is far from invariable. For even when the quantity of sugar in the urine is two or three per cent, no excessive thirst may be noticeable. In cases where polydipsia is marked we have at the same time polyuria, but this also is not invariably the case.

⁷ VAUGHAN HARLEY. *Journal of Anatomy and Physiology*, Vol. XX., 1891.

Polyphagia is generally a marked symptom, and in spite of this the loss of flesh is very rapid. In some dogs, in the same way, as no polydipsia accompanies the glycosuria, there may be no excessive appetite.

The rapid emaciation is a very marked symptom, and although the animals may be feeding well, they often lose a third of their body weight in about ten days. Accompanying the rapid loss of flesh is very great muscular feebleness, so that the dogs become so weak that they can scarcely move about.

As a rule, dogs die from this emaciation in from one to four weeks. Sandmeyer⁸, in the 21 dogs in which he operated, found that death occurred in from one-and-a-half to fifteen days after total removal of the pancreas.

In some cases coma sets in, and usually proves rapidly fatal. Preceding this coma, we always find aceto-acetic acid in the urine, and often β -oxybutyric acid. As a rule, sugar disappears from the urine at least twenty-four hours before the coma sets in.⁹

The direct effects of the absence of the pancreatic juice from the intestines on metabolism have been studied by Abelman¹⁰ and by myself.¹¹ A mere casual examination of the fæces is very characteristic. For they have not only an excessively foul odour, but in them are seen large quantities of undigested food. In dogs it has been found that proteids are very imperfectly absorbed from the alimentary tract when the entire gland is removed; only from 18 to 28 per cent of the proteids given are absorbed in the alimentary canal. In those cases where the pancreas is only partially extirpated, and no pancreatic juice reaches the intestines, though sufficient gland tissue is left to prevent glycosuria, the absorption of proteids is from 40 to 83 per cent.

As regards fat, when the pancreas is completely removed and milk fat is given as diet, 4 to 38 per cent can be absorbed, but the quantity absorbed varies with the time after the operation, for as the animal gets progressively weaker, its power of absorption of milk fat also diminishes. Mutton fat is almost completely unabsorbed. On the other hand, when the gland is only partially removed, as much as 25 or even 59 per cent of mutton fat is in some cases absorbed.

The absorption of carbo-hydrates is also hindered, but not to so marked an extent as that of the fat and the proteids. In cases of complete removal of the pancreas, from 57 to 61 per cent of the carbo-hydrates given in the diet is made use of. In partial extirpation, from 77 to 78 per cent of the carbo-hydrates given in the diet is absorbed.

⁸ SANDMEYER. *Zeit. f. Biol.*, N. F., Vol. XI., p. 86.

⁹ VAUGHAN HARLEY. *Brit. Med. Jour.*, September, 1893.

¹⁰ ABELMANN. *Inaug. Diss.*, Dorpat, 1889.

¹¹ VAUGHAN HARLEY. *Jour. of Path. and Bact.*, 1895, and *Jour. of Physiology*, Vol. XVIII., p. 1, 1895.

This defective absorption of the three food stuffs—proteids, fats, and carbo-hydrates—is partly, at least, the cause of the rapid emaciation; while the defective assimilation of sugar in those cases in which the gland has been entirely removed is also one of the factors. It would seem, however, that when the gland is entirely removed, besides the appearance of sugar in the urine, some other marked deteriorations in metabolism take place, as the emaciation is very much more rapid than in those cases where the gland is only partially removed. And still further, the absorption of food stuffs is less in those cases in which the gland has been entirely removed than in those cases in which only the pancreatic secretion has been hindered from reaching the intestines, and some gland tissue left, sufficient to stop the presence of sugar in the urine.

PATHOGENESIS OF PANCREATIC DIABETES.

The symptoms following the complete removal of the pancreas in animals having been described, our next point is to try and explain their cause. The first symptom to consider in this paper is the most important one, the presence of sugar in the urine, which, as already stated, invariably follows the complete removal of the pancreas.

In cases of partial removal of the pancreas, or the ligature of its duct or ducts, only a transient glycosuria occurs. In a few cases the sugar does not make its appearance in the urine till long after the operation, and in them it is found at the autopsy that the remaining portion of the pancreas has become atrophied or disorganised, and therefore these cases correspond to those of complete removal of the gland.

The appearance of sugar in the urine in cases of pancreatic diabetes is known to be combined with an increased quantity of sugar in the blood, for while a normal dog's blood contains only from 0.05 to 0.15 per cent of sugar, in dogs rendered diabetic by removal of the pancreas, the blood contains from 0.3 to 0.46 per cent. This increase of the sugar in the blood is partly due to the fact of the rapid disappearance of glycogen from the liver and other organs. But it would appear to be principally due to a defective assimilation of sugar, so that from not being made use of in the normal way it accumulates in the organism.

Lépine and Barral consider that the pancreas forms a soluble ferment which circulates normally in the blood, reaching the circulation by means of lymphatics, and which they termed the glycolitic ferment, its action being supposed to be the destruction of blood sugar.

While in a normal dog the assimilation or destruction of sugar takes place in the various organs, in a dog in which the pancreas is removed, although some destruction of sugar may occur in the tissues of the body,

the absence of the pancreatic glycolitic ferment causes a diminution in its destruction, so that sugar is increased in the blood and therefore appears in the urine.

That blood taken from the normal body, even when kept from the action of bacteria, possesses the power of destroying sugar, was pointed out by myself,¹² and has been confirmed by numerous observers since. Lépine and Barral stated that blood from dogs rendered diabetic by removal of the pancreas no longer possessed this power.

They further¹³ state that when the pancreatic nerves are cut, the formation of this glycolitic ferment is increased in the same way as we get a paralytic flow of saliva, and still further,¹⁴ that a backward pressure in Wirsung's duct also caused an increase of this glycolytic ferment.

It would appear that the pancreas has a double action. Firstly, in excreting into the alimentary canal pancreatic juice; secondly, forming some substance or substances which reach the blood either directly or through the lymphatics. Whether or not this is the glycolytic ferment of Lépine is still undecided.

This internal secretion of the pancreas appears to be somewhat similar to what we have in the case of the thyroid, for when it is totally removed, certain well-known symptoms follow; while if a small portion of the gland is left, no symptoms occur. The same thing holds good with the pancreas, for when even a 16th of the gland is left no sugar appears in the urine, while on removing the whole gland diabetes invariably occurs. It must be remembered that the pancreas cannot be said to be the exact analogue of the thyroid, for neither feeding with raw pancreas nor injections of its extracts have been found to have any influence on the quantity of sugar in the urine of diabetics.

The experiments of Minkowski, in which, by transplanting a portion of the pancreas into the abdominal wall, he hindered the glycosuria, strongly support the view that some substance or substances are formed in the pancreas which help the assimilation or destruction of sugar in the organism.

Lépine's glycolytic ferment has been disputed by Arthus and Seegen, but the discussion of this subject is too exhaustive to be fully gone into here.

As regards the presence of acetone, aceto-acetic acid, and β -oxybutyric acid in the urine, these appear to be partly due to the rapid breaking up of the tissues.¹⁵ The coma, again, which precedes a fatal

¹² VAUGHAN HARLEY. *Journ. of Path. and Bact.*, Vol. XII., p. 391, 1891.

¹³ LÉPINE and BARRAL. *Compt. Rendus*, 1891.

¹⁴ LÉPINE. *Société des Sciences Méd. de Lyon*, 1892.

¹⁵ VAUGHAN HARLEY. *Arch. für Anat. und Physiol.*, p. 46, 1893.

termination is probably due to a diminution taking place in the alkalinity of the blood, owing to the presence of acid products derived from the excess of sugar in the circulation.

The emaciation, as already stated, seems to be due to a mal-absorption and a mal-assimilation of food. That a mal-assimilation occurs is pointed out by Sandmeyer in the fact that fatty degeneration of the liver, muscles, etc., is seen to occur soon after removal of the pancreas from dogs, and the liver may contain as much as 40 per cent of fat.

Having finished with diabetes mellitus as it occurs in dogs, I may add that the same holds good for pigs, cats, rabbits, and the various other animals which have so far been the subject of experiment; and can now consider the pancreatic diabetes of man with the above data as our guide.

In the first place, that cases of diabetes exist in man in which the pancreas is not diseased is as an undoubted fact as that the removal of the pancreas is able to produce diabetes in animals. For we know that we get marked cases of diabetes in diseases of the central nervous system and the liver, which at a post mortem show no lesions whatsoever of the pancreas.

Moreover, it has been shown by Hansemann¹⁶ that in certain cases in which the pancreas is diseased diabetes does not occur. Consequently we can group diseases of the pancreas into those accompanied with diabetes and those unaccompanied with diabetes.

Cases of Disease of the Pancreas accompanied with Diabetes.—First, simple atrophy of the gland substance. Second, atrophy of the gland cells, with sclerosis of the connective tissue (especially syphilitic in children). Third, atrophy of the gland cells after obstruction of the pancreatic duct, as occurs in carcinoma of the head of the pancreas and in some cases of calculus obstruction.

Cases of Disease of the Pancreas without Diabetes.—First, simple obstruction of the duct with calculus. This may even be accompanied with some atrophy; but in all those cases in which no sugar appears in the urine we invariably find microscopically some of the gland cells normal, or, at the most, merely a little fatty. Second, as a rule, cloudy swelling, or fatty degeneration, is not accompanied with diabetes, even when some slight atrophy of the gland substance occurs. Third, pancreatic necrosis is rarely accompanied with diabetes. This may be partly accounted for by the rapidly fatal termination of such cases, and in those few where the autopsy shows complete necrosis of the gland it has probably only occurred shortly before death. Fourth, diffuse carcinoma of the pancreas. Hansemann describes the case of a man aged

¹⁶ HANSEMAN. "Pathologia Generale," p. 148, *Atti dell XI. Congresso Medico Internazionale*. Roma, 1894.

52 in which at the autopsy all the pancreas was converted into carcinomatous tissue, yet at no period during the illness was there any glycosuria. He considers that such cases of pancreatic carcinoma without diabetes are due to the carcinomatous cells, although they are unable to form pancreatic juice, being still capable of replacing the normal pancreatic cells as far as their sugar function is concerned. Fifth, pancreatic cysts. These naturally are never accompanied with diabetes, as there is only a small destruction of pancreatic tissue in such cases.

When we consider those diseases of the pancreas with and without diabetes *en masse*, we only find verified in the post-mortem room what experimental pathology has taught us to expect. Thus, in those cases only in which the pancreas is completely destroyed by disease do we find diabetes, and in all the cases where a small amount of normal pancreatic tissue still remains, as in the case of the dogs, no diabetes occurs.

The only apparent contradictions to this are in those rare cases of necrosis or diffuse carcinoma of the pancreas. If, however, in these the explanation above given is not the right one, there still remains the fact, borne out by experiment, that dogs suffering from inflammatory diseases, or when marked wasting occurs, often have no glycosuria.

Having now shown in what diseased conditions of the pancreas diabetes occurs, I will proceed to describe what are the symptoms of pancreatic diabetes in man, and try and differentiate them from those accompanying the other forms of the disease.

THE SYMPTOMS OF PANCREATIC DIABETES IN MAN.

The signs and symptoms of diabetes due to pancreatic disease in man present, in several respects, well marked differences from those usually manifested in the other forms of diabetes, the onset of the diabetes being marked by the suddenness with which the thirst, voracious appetite, and polyuria manifest themselves, in association with the presence of sugar in the urine. Moreover, it attacks usually persons under middle age.

Pancreatic diabetes differs still further from the ordinary forms of glycosuria, in the uninterrupted rapidity with which it marches on to a fatal termination. Nervous prostration and great muscular debility, accompanied by the rapid emaciation, being, as a rule, quickly followed by a comatose condition, which soon leads to a fatal end.

In addition to these all-important signs, we have marked changes in the fæces; even the casual observer will notice that they contain particles of undigested food, and on being freshly passed, float about in an oily fluid, which, on cooling, hardens into a dirty yellowish grease.¹⁷ Chemical analysis shows that instead of the normal 2 to 3 grams of

¹⁷ GEORGE HARLEY. "Diseases of the Liver and Pancreas." Walton-Maberley, 1863.

nitrogen, they generally contain 5 to 20, or even more. That is to say, instead of only 5 to 8 per cent of the nitrogen given with the food being excreted in the fæces, 40 to 80 per cent is eliminated. The quantity of fat found in them may be 100 or more grams, according to the quantity given in the diet. So that the percentage of the fat taken with the diet, eliminated in the fæces, will be from 60 to 80 per cent, whereas in health only from 2 to 6 per cent is so eliminated. The fæces, as in dogs, also invariably have a most foul odour.¹⁸

With regard to the urine in pancreatic diabetic patients, the sugar is, as a rule, not very great, although it may reach as much as 7 per cent, or even more. It rapidly reaches its maximum, and remains near to it until shortly before death, when it entirely disappears. The nitrogen in the urine (the same as in the cases of dogs) is increased out of all proportion to the quantity of nitrogen taken in the food. This is, as in the case of dogs, accounted for by the rapid breaking down of the tissue proteids and the elimination of their nitrogen in the urine. Acetone is almost invariably found in the urine of these patients. In some cases aceto-acetic acid, and even β -oxybutyric acid appears in the urine, and is almost invariably the sign of approaching coma.¹⁹

It is seen from the above description of the symptoms of pancreatic diabetes met with in man, that they tally almost entirely with those found in the case of dogs. In the same way as we found that, in dogs, thirst and voracious appetite are not always present, we find also in some rare cases in man throughout the illness, no marked polydipsia or polyphagia. In order to illustrate the above described general symptoms, I will give two cases in which the post-mortems confirmed pancreatic lesion being the cause of the diabetes.

The first case came under my observation in September, 1890, through the kindness of Professor Heiberg and Professor Torup,²⁰ of Christiania.

Y. R., aged 23, a medical student; as a child enjoyed good health, although pale and of somewhat a scrofulous appearance. He was a diligent boy at school, and always held a good place in his class. On entering the University to study medicine he was not well developed, and seemed mentally languid, although he never complained of being ill, and was sufficiently strong to be accepted as a soldier for service in the summer of 1890. In June he found his duties as a recruit very trying, and after serving fourteen days he was discharged. In the middle of August he suffered from catarrhal tonsillitis, which weakened him very much. On

¹⁸ VAUGHAN HARLEY. "Metabolism in obstruction of pancreatic duct."—*Trans. Path. Soc.*, 1895.

¹⁹ For fuller account of this coma, see VAUGHAN HARLEY, *Brit. Med. Journ.*, Sept. 23, 1893.

²⁰ VAUGHAN HARLEY. *British Medical Journal*, 1892.

the 26th of the same month he complained of being very languid, sleepless, and having headaches. At this time his great thirst and constant hunger led to the analysing of his urine, and sugar was discovered. He soon became drowsy and restless, constantly wanting to get out of bed; but when out of it he was unable, on account of his weak condition, to sit up for long. The quantity of urine passed was from 4 to 6 litres per diem, it contained 2 per cent of sugar and acetone, and aceto-acetic acid. The urine was not analysed for β -oxybutyric acid. His tongue was very dry, and his breath had a distinct aromatic, apple-like odour. His weakness rapidly increased, and during the last few days of his life he was almost completely comatose. Up to the last day he could always be roused from the state of stupor; he died quietly on the 6th of September, that is to say, 11 days after the diabetic state was discovered. Despite fatty degeneration of the kidneys, the pancreas alone was found markedly diseased; its head was entirely converted into a round mass about the size of a duck's head, while all that remained of the tail of the pancreas was merely a thin flat fibrous band. Within the head of the organ was found a cavity the size of a cherry, filled with semi-purulent fluid. The surrounding substance was found, microscopically, to be made up of numerous small abscesses. The connective tissue was greatly increased, and what few gland cells were left showed marked fatty degeneration.

In this case it is known that the diabetes probably was only of short duration; at any rate he had no sugar in his urine in June of the same year, when he passed his army medical examination.

The next case is one recorded by George F. Duffy²¹.

A farm labourer, aged 24, but looking older, six feet in height and well made, stated he had always enjoyed the best of health until about five weeks before his admission to the City of Dublin Hospital, on the 18th October, 1893. The first symptoms he noticed were polyphagia, polydipsia, polyuria, and emaciation. After about a fortnight he began to feel languid and weak; he did not sleep well, and found he had lost a stone in weight. On admission he presented the usual symptoms of advanced diabetes mellitus. He seemed remarkably apathetic, and rarely spoke except in answer to questions. He preferred staying in bed to getting up, and stated he did so because he got so easily tired. During his stay in hospital he passed from five to six litres of urine in the 24 hours, which had a specific gravity of 1040 to 1045. The quantity of sugar is not stated. The urine gave the reaction of aceto-acetic acid, and acetone was also present. For ten days he remained in much the same state until, without evident cause, his bowels, which had been

²¹ "On the connection of acute diabetes with the disease of the pancreas."—*Trans. Acad. Med. Ire.*, Vol. II., p. 406, 1884.

constipated, became exceedingly loose, and vomiting occurred ; he then complained of pain in the epigastrium, and the abdomen was tender on pressure. The diarrhoea persisted for a week, the stools were somewhat of a dysenteric character, being very frequent, in small quantity, of a jelly-like consistence, and extremely foetid. For the first two or three days they contained white masses resembling lumps of undigested fat, but this disappeared on giving him peptonised milk.

He had now completely lost his voracious appetite, but was even more thirsty than on admission. The debility and emaciation increased. On the evening of the 3rd of November his temperature, which had previously been normal, rose to 100° ; but subsequently his extremities became very cold and his pulse so weak that it was almost imperceptible. He then sank into a state of coma, or, more correctly speaking, collapse, and died on the morning of November 6. At the post mortem the liver and nervous system showed no cause for diarrhoea, the pancreas showed no gland tissue, but merely a mass of connective tissue with trabeculae ; between the masses were groups of large irregular nucleated cells, appearing often like lymphoid tissue, and they seemed to be of a carcinomatous nature.

It is seen in these two cases, both of which were verified as pancreatic in origin by the autopsy, that the same series of symptoms occurred as are met with in the case of dogs after the removal of the pancreas.

If we look through the literature on the subject we find other cases recorded, both in England, Germany, and France, which resemble them in every respect ; and that the different types found in animals have been also found in man. This is most valuable, showing as it does the utility of experimental pathology, for until we had the knowledge obtained by experimenting on animals, in which the entire pancreas had been removed, the significance of disease of the pancreas as a factor in causing diabetes was not thoroughly appreciated. Fortunately, we are now not only able to form a correct diagnosis of this serious form of diabetes, but, what is of equal moment, able to give a definite prognosis ; for, of all the forms of diabetes at present known, none appear to be so speedily fatal as that owing its origin to pancreas disease.

Having in this paper been compelled from want of space to give my data very briefly, I have tried specially to bring out the fact that experimental pathologists do not regard all cases of diabetes mellitus as pancreatic on the one hand, and that disease of the pancreas even may be present and yet no diabetes occur, so long as a portion of gland tissue remains capable of carrying on its function in a comparatively normal manner.

THE CLINICAL VALUE OF THE PHENYL-HYDRAZIN TEST FOR SUGAR IN THE URINE.

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IN spite of the great number of tests for sugar, there can be no doubt that, as a clinical test, Fehling's solution, or some modification thereof, is the most *generally* useful. In the majority of cases, for clinical work, nothing more is required. If a negative result is obtained, the urine may be declared practically free from sugar. If a well-marked reduction of oxide of copper occurs, and if there are other indications of diabetes, the test is sufficient. But there is a third class of cases, occasionally met with, which is liable to cause trouble, especially in the careful examination of urine in the case of life assurance. There are no indications of diabetes or glycosuria, except a slight reduction of Fehling's solution. Often after the urine has been raised to the boiling point, the fluid is unchanged at first, but after a time becomes greenish and opaque. Then the question arises, is this slight reduction due to sugar or not? As there are other bodies that reduce Fehling's solution besides sugar, and as Fehling's solution is very liable to decompose in one's private urine test stand, confirmatory tests are necessary in these cases. The best confirmatory test is undoubtedly the fermentation test, when certain precautions are used.* But the fermentation test requires a little care and time in arranging. Yeast cannot be kept in a test stand for more than a few days, hence it is necessary to send for a fresh supply each time the test is performed. Also fermentation is not so sensitive as some other sugar test; it will only indicate 0.1 per cent of sugar. So that a urine may reduce Fehling's solution slightly and give no reaction with fermentation, and yet contain a very small amount of sugar.

A confirmatory test, about which much has been recently written, is the phenyl-hydrazin test.

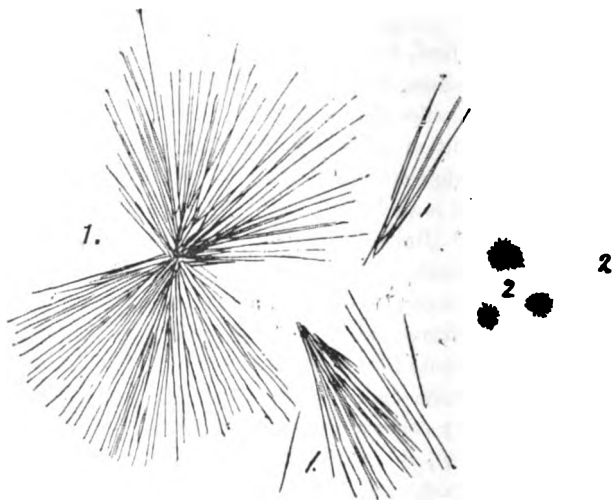
The researches of Emil Fischer† have shown that various kinds of sugar are able to combine with phenyl-hydrazin and form definite crystalline compounds—osazones. These compounds present minor differences in their melting points, solubility, etc., according to the form of sugar from which they have been prepared.

* The suspected urine is mixed with yeast in an inverted test tube. If sugar be present, gas collects at the top of the tube. A control tube containing yeast, with normal urine, is necessary, as a very small quantity of gas is given off from the yeast alone.

† *Berichte der Deutsche chem. Gesellsch.*, XVII., p. 579, 1884.

By the action of phenyl-hydrazin on grape sugar a characteristic crystalline compound is formed, phenyl-glucosazone. The crystals are needle-shaped and have a bright sulphur yellow colour. This reaction was strongly recommended by von Jaksch some years ago* as the basis of a clinical test for grape sugar in the urine. The following is the method which he recommends † :—

Two parts of hydrochlorate of phenyl-hydrazin (twice as much of the phenyl-hydrazin salt as will lie on the point of a knife) and three of acetate of soda are placed together in a test tube containing 6—8 cc. of urine. If the salts do not dissolve when the fluid is warmed, a little water is added, and the test tube containing the mixture is placed for 20—30 minutes in boiling water. After this it is taken out and put into a vessel containing cold water. If sugar be present a yellowish deposit forms, which, on microscopical examination, is seen to contain yellow needle-shaped crystals, often in clusters, in tufts, sheaves, or rosettes. These are the crystals of phenyl glucosazone, which have a melting point of 205° C.



PHENYL-HYDRAZIN TEST FOR SUGAR.

- 1.—Yellow Crystals of Phenyl-glucosazone, obtained from diabetic urine.
- 2.—Minute Yellow Crystals, obtained from normal urine, Moritz's method.

Now, if performed in this manner, it is necessary to make use of a water bath, and to keep the water boiling for 20—30 minutes. This, of course, presents no difficulty in the laboratory, but for *clinical* work

* V. JAKSCH. *Zeitschrift f. klin. Med.*, XI., 20, 1886.

† V. JAKSCH. "Clinical Diagnosis." Translated by J. Cagney. London, 1890, p. 226.

is somewhat troublesome. Also, I believe, in the hands of many medical men, the test has sometimes failed when performed in this manner, even though sugar has been present in the urine in considerable amount. One cause of this failure is probably because the quantity of the reagent recommended in von Jaksch's description of the test (viz., twice as much phenyl-hydrazin as will lie on the point of a knife) is somewhat indefinite, and this description has been copied in many accounts of the test which are given in English medical text books.

The object of this note is (1) to draw attention to a *very simple* clinical method of performing the phenyl-hydrazin test which I have employed for five years with the best success—a method described in foreign medical literature some years ago, but not generally referred to in English medical books; and (2) to consider the *value* of the test.

I.—*The Simple Method* to which I refer has been described in the work on urine analysis by Hoffmann and Ultzmann, and the following, which I have found so useful, is a very slight modification thereof. A test tube of ordinary size is filled for about half an inch with hydrochlorate of phenyl-hydrazin* (in powder); then acetate of soda in powder (or small crystals) is added for another half inch. The test tube is then half filled with urine and boiled over a spirit lamp. In performing the test I have not attempted to dissolve the salts by shaking the tube, but have simply applied the flame of the lamp to the bottom of the tube, and the powders have soon passed into solution as the tube has been heated. After the urine has reached the boiling point, I have always continued to boil for about two minutes. The tube is then left in the test stand and examined again some time afterwards. If sugar is present, a yellowish deposit forms at the bottom of the tube, and on microscopical examination this deposit is seen to consist chiefly of beautiful needle-shaped crystals of a bright sulphur yellow colour. Generally the needles are arranged in tufts, sheaves, or rosettes. The crystals are frequently found after the tube has been standing for half an hour; but after boiling the tube I have generally placed it in a test stand and not examined the deposit until next day, or, at least, until six or eight hours afterwards. If no sugar is present, only brownish amorphous globules or yellowish scales are found in the deposit. This method is exceedingly simple, and very little time and attention are required. In four minutes the first part of the test can be easily completed; the tube is then left in the test stand and examined at a convenient time some hours later, or on the following day. Permanent specimens of the crystals can be prepared by drying a little of the deposit on a slide and mounting it in Canada balsam.

* Hydrochlorate of phenyl-hydrazin is a brownish powder having a peculiar smell. It is simply kept in the powdered form in a dry bottle. The acetate of soda is also kept in a dry powder in another bottle.

II.—*The Value of the Test.*—I have used this simplified method for five years in a very large number of urine examinations, and have never failed to find easily, on microscopical examination, *abundance* of the characteristic crystals, if sugar has been present in the urine, even when the quantity has been very minute. The reagents are powders which appear to *keep well*. If kept dry in bottles I have never found any change or decomposition in the phenyl-hydrazin hydrochlorate, nor in the acetate of soda, even after many months; and in this respect the reagents have a distinct advantage over Fehling's solution, which so frequently decomposes.

The test can be performed, and the characteristic crystals easily obtained, even when the urine contains a large quantity of albumen. I have found the crystals easily in a urine which was loaded with albumen, but which contained only a very small amount of sugar. In these cases the bright yellow crystals stand out well, and are easily distinguished from the amorphous granules of coagulated albumen on microscopic examination.

By performing the test in the simple manner just described (i.e., boiling for two minutes only), I have never obtained any crystals of phenyl-glucosazone in normal urine. Recently I applied this test to the urines of 50 persons who were either in good health or were not suffering from any disease which is accompanied by glycosuria or other diabetic symptoms. [In each case no reaction for sugar was obtained with Fehling's solution.] I was never able to find any trace of phenyl-glucosazone crystals in these 50 cases. Hence I think this simplified method of performing the test may be regarded as quite *reliable* for chemical work, and *not too sensitive*.

A great advantage of the phenyl-hydrazen test is that it gives no reaction with uric acid, creatinine, hippuric acid, pyrocatechin, etc., whilst these substances, if in excess in the urine, may reduce Fehling's solution to a slight extent, especially if the urine be heated too long.

Now, two objections have been raised to phenyl-hydrazin as a clinical test for sugar in the urine. (1) It is said to be *too sensitive* for clinical work, and to often give a slight reaction with normal urine. (2) It is said that glycuronic acid, if present in the urine, will give rise to crystals similar to those of phenyl-glucosazone.

As regards the objection that it is *too sensitive* for clinical work, it has been pointed out by many observers that a small deposit of the crystals may be obtained in many normal urines. Thus, Binet* succeeded in obtaining the crystals in one-half of the normal urines which he examined, but the test tube was kept in a *hot water bath for one hour*.

* *Revue Médicale de la Suisse Romande*, February 10, 1892.

Moritz* has pointed out that if *certain proportions* of the reagents be employed a slight deposit of minute yellow crystals can be obtained in almost *all* normal urines. These proportions are as follows:—To 10 cc. of urine, 0·5 grams of hydrochlorate of phenyl-hydrazin and 1·0 gram of sodium acetate are added. The tube is placed in a water bath which is heated for one hour. I have performed the test in this manner a good number of times with perfectly normal urine, and have always succeeded easily in obtaining a very slight deposit of the minute yellow crystals *when I have followed Moritz's method strictly*. But, as above mentioned, I have never succeeded in obtaining the crystals from normal urine when I have employed the *simple method*—boiling in a test tube for two minutes only.

The crystals obtained from diabetic urine are generally long fine needles (see Fig. 1), but those obtained from normal urine by Moritz's method are minute very short needles, more plump, and arranged generally in rosettes, forming "thorn-apple" crystals (see Fig. 2). According to Jolles,† the crystals obtained from normal urine are *always* thicker and more plump than in diabetes. Both have the same sulphur yellow colour. Even when diabetic urine is very greatly diluted, so that the amount of sugar is only 0·015 per cent, the crystals may be still *long* fine needles. Whilst I have always found the crystals minute and *very short* (thorn-apple crystals) when obtained from normal urine by Moritz's method, and those obtained from diabetic urine, even if greatly diluted, generally in the form of *long* fine needles, still, in the case of glycosuria, I have occasionally found shorter forms of crystals.

Moritz‡ points out that in normal urine, even when his very sensitive method is used, the deposit of yellow crystals is *very small* in amount, whilst in glycosuria and diabetes the deposit of crystals is *very abundant*. He regards this as a point of importance in distinguishing between normal urine and urine in glycosuria.

Now, the question arises, what is the cause of the small deposit of minute short crystals in normal urine when the test is carried out according to Moritz's *sensitive method*? On this point there is considerable difference of opinion.

Thierfelder§ has shown that glycuronic acid forms yellow needle-shaped crystals with phenyl-hydrazin. According to Flückiger|| a very small amount of glycuronic acid is present in normal urine, and the

* *Deutsches Archiv. f. klin. Med.*, Bd. XLVI., p. 255.

† *Centralblatt f. innere Med.*, November 8 and 10, 1894.

‡ *Münchener medicinische Wochenschrift*, Nos. 1 and 2, 1891.

§ *Zeitschrift f. Physiolog. Chemie*, Bd. XL., p. 395.

|| *Jahresbericht über die Fortschritte des Thier. Chemie*, Bd. XVIII., p. 106.

minute crystals obtained from normal urine by the *delicate* method of performing the phenyl-hydrazin test are due to this acid. Geyer* states that after the action of yeast on normal urine the crystals are still obtained, and he regards them as due to glycuronic acid. If the substance in normal urine was a trace of sugar it would be destroyed by fermentation with yeast. Jolles† believes the crystals obtained from normal urine are due to glycuronic acid. Moritz believes that this small deposit of short crystals is due partly to the small amount of sugar, which (according to some physiologists) is present in normal urine, partly to other substances, possibly glycuronic acid.

By a careful chemical process (described in the *Deutsches Archiv f. klin. Med.*, Bd. XLVI., p. 257) Moritz has obtained, by the phenyl-hydrazin tests, yellow needle-shaped crystals from normal urine, which he has proved to be due to sugar and not to glycuronic acid, since their melting point was 204° — 205° C. Hence he concludes that a trace of sugar is found in normal urine.

I have made several experiments on this point, but have not been able to confirm Geyer's statement that these minute crystals are still obtained after the action of yeast on normal urine. It has been pointed out by Seegen that if a fluid such as urine contains a very small amount of sugar it ferments very slowly (38 hours may be required to complete the fermentation). If the minute crystals obtained from normal urine are due to the *trace* of sugar which some physiologists think it always contains, then in order to decompose it by fermentation it would be necessary to submit the urine to the prolonged action of yeast. I find that after the action of yeast for 40 hours these minute crystals cannot be obtained from normal urine by Moritz's method of carrying out the phenyl-hydrazin test.

A quantity of normal recently passed urine was divided into two portions. One portion was placed in a bottle without the addition of any yeast. To the other portion a quantity of yeast was added, and it was kept for 40 hours in a warm place. At the end of this time 10cc. of the urine to which no yeast had been added were placed in a test tube (A) with 0.5 grm. phenyl-hydrazin hydrochlorate and 1 grm. sodium acetate. Into a second tube (B) was placed 10cc. of the urine to which the yeast had been added (and which had been kept warm), and 0.5 grm. of phenyl-hydrazin hydrochlorate and 1 grm. sodium acetate were added. Both test tubes were placed in the same water-bath and heated for one hour; the tubes were then allowed to stand until next day. The deposit in the former tube (A) contained minute yellow crystals; whilst in the deposit in the latter tube (B)—i.e., in urine which had been submitted to the action of yeast for 40 hours—no crystals could be found.

Another experiment was performed in the same manner, but the specimens were tested at the end of 20 hours. Both in the urine to which the yeast had been added and in that to which no yeast had been added minute yellow crystals were obtained.

* *Zeitschrift f. Physiolog. Chemie*, Bd. IX., p. 523.

† *Centralblatt f. innere Med.*, November 3 and 10, 1894.

From these experiments we may conclude that the substance in normal urine which gives rise to the minute yellow crystals (when Moritz's delicate method of performing the phenyl-hydrazin test is followed) is a body which is destroyed by the action of yeast and warmth for 40 hours; but is not destroyed by the action of yeast for 20 hours. Hence I am inclined to believe that this substance is the minute trace of sugar which many physiologists assert to be present in normal urine.

The melting point of the crystals is said to be of importance. The yellow crystals obtained by the combination of phenyl-hydrazin and sugar melt at 205°C ., whilst those due to glycuronic acid melt at 114° — 115°C .

Now, whatever may be the cause of these minute crystals, they appear to me to form a serious objection to the test if it is performed in the delicate method with the use of the water-bath. Though the deposit of the crystal is very small in normal urine, and always *abundant*, if only a very slight degree of glycosuria exists; and though the crystals are *generally* much smaller and more plump in normal urine than in the case of glycosuria, still I think that these points are insufficient to enable any, but those who have had great experience in the test, to decide whether a very small pathological amount of sugar be or be not present in any suspected urine.

If, however, the water-bath be *not* used, and the test be performed in the simple method above described—*i.e.*, boiling in a test tube for two minutes only—*this objection does not hold*. By this simple method these troublesome and dubious minute yellow crystals *are not obtained in normal urine*.

A second objection to the phenyl-hydrazin test is that yellow crystals similar to those of phenyl-glucosazone are produced when glycuronic acid is present in the urine.

Glycuronic acid ($\text{C}_6\text{H}_{10}\text{O}_7$) is a substance which is liable to be mistaken for sugar in the urine. It reduces Fehling's solution, bismuth, silver, and mercury oxides in an alkaline solution. According to Halliburton ("Textbook of Chemical Physiology and Pathology," London, 1891, p. 793), "it occurs in normal urine in such small quantities that it may be considered, to be practically absent. It occurs in the urine in abundance after the administration of certain poisons and drugs, such as chloral and butyl-chloral, nitro-benzol, ortho-nitro-toluol, camphor, curare, morphia, and after chloroform narcosis."

"These drugs were said to produce glycosuria by the older observers, but that sugar is absent can be shown by the non-occurrence of alcoholic fermentation with yeast." The clinical importance of this substance is not great; where due to the administration of drugs, the condition is a transitory one. If all drugs be discontinued, the glycuronic acid dis

appears from the urine. Ashdown (*British Medical Journal*, 1890, Vol. I., 169), has recorded a case, however, in which it was present in the urine though the patient was taking no drugs. Such cases, are, however, *exceedingly* rare.

The melting point of the crystals, due to glycuronic acid is 114° — 115° C, whilst that of the crystals of phenyl-glucosazone is 205° C. But it is evident, that for clinical work, the determining of the melting point of the crystals is too troublesome and tedious a matter. The urine of patients taking salicylate of soda and salol generally gives a slight reduction of Fehling's solution, and, this is said to be due to glycuronic acid. In these cases I have sometimes found yellow needle-shaped crystals with the phenyl-hydrazin test, even when the simplified method has been employed, but only in about one-third of the cases.

The objection that glycuronic acid may give rise to fallacy is a valid one, though practically it is not likely to give rise to much trouble, since the occurrence of glycuronic acid in any quantity of practical importance is *generally* due to some drug, and in such cases discontinuance of the medicine causes it to disappear from the urine, and then crystals will no longer be obtained by the simplified method of testing. Still there is the possibility of the exceedingly rare occurrence of glycuronic acid, apart from any drug treatment.

Three cases have been recorded recently by Salkowski,* in which *pentose* has been found in the urine. This is a variety of sugar, containing 5 atoms of carbon, which reduces oxide of copper in Trommer's test, but does not ferment with yeast. With phenyl-hydrazin it forms yellow needle-shaped crystals, which melt at 159° C. But whether such crystals would be produced by the simplified phenyl-hydrazin test (boiling for two minutes only), I do not know. The occurrence of this substance in the urine is probably exceeding rare, but it is now to be borne in mind as a possible, though very improbable, source of fallacy, both in the Fehling's test and in the phenyl-hydrazin test.

The Delicacy of the Simplified Phenyl-hydrazin Test (boiling for two minutes only).—As above-mentioned, the simplified method is not too sensitive; it does not give any reaction with normal urine. Still, it is exceedingly delicate; more delicate than fermentation and than Fehling's solution, as is shown by the following experiments.

A diabetic urine containing 7.5 per cent of sugar was greatly diluted with water until the percentage was only 0.015. This diluted urine gave—(a) no reaction with Fehling's solution in the cold; (b) no reaction with Fehling's solution on boiling; (c) no indication of sugar by the fermentation test; (d) but a distinct deposit of long yellow crystals, with the phenyl-hydrazin test (simplified method) boiling two minutes only.

* *Berliner klinische Wochenschrift*, April 29, 1896.

CONCLUSIONS.

(1) The phenyl-hydrazin test, if performed according to the above-described *simplified method* (i.e., boiling the reagents with the urine for two minutes only) is a most valuable confirmatory test for sugar in the urine. The reagents do not readily decompose, the test is easily carried out, and is very suitable for clinical work. It is very sensitive—*more sensitive* than Fehling's test and the fermentation test—and will give a reaction with diluted urine containing only 0.015 per cent of sugar. But it is not too sensitive, and gives *no reaction with normal urine*.

(2) If in performing the test, a water bath be used, and boiling prolonged, the phenyl-hydrazin test is too sensitive, and is somewhat troublesome for clinical work.

(3) The great value of the phenyl-hydrazin test (simplified method) is as a *negative test*. A urine which gives no reaction by this method may be declared quite free from sugar for practical purposes.

(4) In a doubtful case, in which a slight reduction of copper oxide occurs in the urine with Fehling's test, if the simplified phenyl-hydrazin test gives no reaction, then the urine may be declared free from sugar, and the reduction of copper due to some other body.

(5) Beside the various forms of sugar, so far as is known, only glycuronic acid and pentose also give the phenyl-hydrazin reaction in the urine, but many substances, which may occur in the urine, reduce Fehling's solution. Excess of uric acid, creatinine, hippuric acid, pyrocatechin may cause a urine to reduce Fehling's solution, but only to a slight extent. These substances do not give any reaction with the phenyl-hydrazin test. Glycuronic acid and pentose reduce Fehling's solution, and also give rise to yellow needle-shaped crystals with the phenyl-hydrazin test. Hence, in any doubtful case, in which, for example, there is only a slight reduction of Fehling's solution, if the urine also gives rise to yellow needle-shaped crystals with the phenyl-hydrazin test, it contains sugar, glycuronic acid or pentose. If the patient should be taking any drug, this must be discontinued, and the reactions would not then be obtained if glycuronic acid due to medicines were the cause. If no drug is being taken, and the urine reacts to the simplified phenyl-hydrazin test, it is exceedingly probable that it contains sugar, since the occurrence of glycuronic acid and pentose in the urine in sufficient quantities to give the reactions is extremely rare.*

* A positive result of the fermentation test would be conclusive of the presence of sugar; a negative result would simply show that sugar was either below 0.1 per cent, or altogether absent.

EARLY DIAGNOSIS OF CANCER OF THE CERVIX UTERI: A PATHOGNOMONIC SIGN.*

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THERE is at the present time a tolerable consensus of opinion that cancer, affecting the cervix uteri, can, in its early stages, be successfully dealt with as a local disease. All specialists in gynaecology, who have turned their attention to the operative treatment of cancer of the uterus, lament the smallness of the number of cases that come into their hands at a sufficiently early stage to give them a reasonable hope that the operation of extirpation will not be followed by comparatively early recurrence. Of such common occurrence is cancer of the uterus that cases are constantly coming into the hands of all general practitioners, and it is on their promptness in recognising the nature of the disease, and having it dealt with in the most efficient manner at present known to us, that our hopes of any considerable improvement in practice must rest. Some of the difficulties in the way of obtaining more satisfactory results in the surgical treatment of uterine cancer arise from the nature of the disease, the absence of striking symptoms, especially of pain, in its early stage, and the patient's ignorance of the significance of irregular discharges and hæmorrhage. The patients are shy about mentioning their troubles; they procrastinate, and when at last they seek advice there is no time to lose, even if it be not already too late to operate.

For the prompt and efficient treatment of the cases which come under our observation in the early and favourable stage, we largely depend upon some definite and easily applicable method of diagnosis. Cancer of the cervix uteri in the ulcerative stage has such marked characters, and is consequently so easily diagnosed, that hesitation in applying to it the radical surgical treatment, if it has not already passed beyond the point at which such treatment may be of service, is, with the present available knowledge, altogether unjustifiable practice. There is, however, a still earlier stage of the disease which occasionally comes under the observation of the practitioner, the most hopeful stage from the point of view of surgical interference, which is too often allowed to pass because of doubt as to the significance of the facts observed and consequent feebleness in action. Any method of diagnosis depending

* Read at a meeting of the North of England Obstetrical and Gynaecological Society at Chester, June, 1895.

upon features which are to be looked for in any given case, and when observed, accepted as sufficient to justify action, must be generally available, and therefore easy of application, by the average general practitioner. In order to attain the maximum amount of usefulness, such diagnostic signs must be comparatively easily found when looked for, and their verification must not require any processes which demand a large amount of time and care and special knowledge on the part of the practitioner. The chief objection to microscopic examination of tissue obtained from a portion of the organ suspected to be diseased, as a method of diagnosis, is the difficulty of its application. It requires special knowledge of the methods of obtaining and preparing tissues for microscopic investigation, and even when such knowledge is available, the amount of time required for its application greatly diminishes its value. In addition to that, we have to remember that the mere histological examination of tissues can only be looked upon as an auxiliary and complement to the observation of clinical facts, not as a substitute for it. It may be said with confidence, therefore, that the usual advice given in books and clinical lectures under the head of diagnosis of cancer of the cervix uteri to make a histological examination of the suspected tissues, is one of more apparent than real usefulness. What we require is an easily applied clinical method of diagnosis, such as will differentiate early cancer from any other condition which a practitioner of average knowledge and intelligence could possibly mistake for it; a method which gives at the same time a moral certainty, or at least the very strongest presumption that the diagnosis depending upon it is correct. Such a method of differentiating between early cancer and other conditions which more or less resemble it is that to which I wish to call your attention.

If in any given case under examination the results obtained by palpation and the closest inspection are such as to leave any doubt in the mind of the practitioner as to whether the condition is or is not early cancer of the cervix, the doubt will, in my opinion, be invariably cleared up by ascertaining the amount of friability of the tissues. If the suspected portion be thoroughly exposed by a suitable speculum, and the uterus held steady by the volsella, if the disease is malignant, a firm scrape with a sharp curette or spoon will enable the examiner to obtain a definite distinct piece of tissue, larger or smaller according to the extent of the infiltration and consequent friableness of the tissue thus operated upon. If it is not malignant, the firm scrape with the sharp curette will only make the parts bleed, and, at the most, some small thin shred or pellicle of semi-translucent epithelium or of granulation will be obtained. The difference is very strikingly brought out by comparing the effects thus produced upon a case of old chronic cervical catarrh with

hypertrophy, ectropium, and retention cysts, with the effects produced by similar forcible application of the spoon to the tissues in the early stage of epithelioma. The existence of this contrast, with its easy application to diagnosis, is of the greatest importance in general practice, inasmuch as chronic cervical catarrh, complicated with the other tissue changes just mentioned, is almost the only condition met with which is at all likely to be mistaken for early epithelioma of the cervix. If we take, for example, the two cases shown in the water colour drawings [the reference to drawings of typical cases made before operation], the characteristic difference does not appear on simple inspection. In the case of malignant disease the ring of the external os is complete, and the diagnosis by simple inspection would have to depend upon a mere *nuance*, an indescribable difference in the colour of the mucous lining and of the discharge at the os in the two cases respectively. A comparison between the results which were obtained by palpation would not have brought us anything further towards the completion of a differential diagnosis. In both cases there was a certain element of hardness, unevenness, and irregularity in the consistency of the tissues about the external os; in both there appeared to be some hypertrophy of the cervix, but there was nothing, as far as touch was concerned, that would justify one in saying that one case was malignant and the other was not. From certain facts in the clinical history of the malignant case the nature of the disease was suspected, and the test of the sharp curette was applied. The instrument cut through from inside the os downward to the vaginal surface of the portio as through a piece of moist cheese, and although a microscopic examination of the tissues was made, the diagnosis was completed by the effects of the curette, taken in conjunction with the other clinical facts, quite independently of the histology. On extirpation of the uterus the condition shown in the annexed drawing was discovered, that is to say, there was extensive breaking down of the tissues of the cervix uteri, extending even above the internal os.

Quite recently I had the opportunity of dealing with a case which formed a striking illustration of the application of this method of diagnosis, where the clinical history, the appearances, and the results obtained by palpation, all tended to support the diagnosis already confidently arrived at before the patient was sent to me, viz., that she was suffering from epithelioma of the cervix uteri. There was, on the posterior lip of the deeply lacerated cervix, a considerable area apparently devoid of epithelium, with an irregular indurated margin studded with small retention cysts, some of which were ulcerating. The test of the sharp curette was applied with a negative result, that is to say, the suspected surface was merely made to bleed, and only some thin particles of epithelium were scraped away.

A distinct mass of friable uterine tissue was not obtained ; nevertheless, the appearance of the hypertrophied eroded posterior lip was so suspicious that it seemed as if an exception to the rule had been found, and therefore the test had failed for all. The patient was kept in bed for several days, and medicated tampons were applied in order to thoroughly cleanse, and as far as possible modify, in a healthy direction, or otherwise, the appearance of the suspected area. The change which took place was of small avail for completing the diagnosis, and the sharp curette test was again applied, with the same result. It was, therefore, decided to proceed with Emmet's operation, as the most effective method of dealing with the laceration and hypertrophy, inasmuch as the definite conclusion was reached that the erosion and other changes could not be owing to malignant disease. In performing the operation, which was duly carried out, the incision on one side invaded the margin of the ulcer, and this was followed immediately by a gush of the fluid characteristic of a retention cyst of the cervix, and the hard and apparently hypertrophied posterior lip at once became flaccid and greatly diminished in bulk. This retention cyst of the cervix was the largest that I have ever seen. The operation was completed, the patient made a perfect recovery, and I heard some weeks afterwards, from her medical attendant, that the symptoms which originally caused alarm had subsided, that the uterus appeared perfectly healthy, and it was almost impossible to make out the points of union in the ring of the perfect external os.

As this is a mere preliminary note I do not care to illustrate the method or to elaborate further. I have applied it myself for about ten years, and have never found it to fail. The suitable application of it presupposes a reasonable amount of knowledge of the diseases of the female sexual organs, and the due consideration and appreciation of all the relevant clinical facts in any given case ; when any doubt still remains in the mind of the practitioner, the effects produced by the sharp curette or spoon should finally settle the diagnosis.

When the operation of vaginal hysterectomy for cancer was being introduced into this country one of the bogeys raised by some of the senior gynecologists was the extreme difficulty of diagnosing cancer of the cervix sufficiently early. This was merely the play of exaggeration giving utterance to prejudice, an illustration of the usual attitude of the post-climacteric intellect to the newer developments. There never was any such extreme difficulty in differentiation as used to be alleged, and more exact observation of the injuries done to the cervix in parturition, and of the subsequent and resulting changes in the injured parts which may take years to develop, has done much to minimise or remove such difficulty as ever existed. It is only in such cases of injury that doubt as to the benign or malignant nature of the changes is excusable. All the

other appearances usually enumerated as simulating cancer have only a superficial resemblance; ignorance and carelessness are essentials to mistaken diagnosis.

The use of the curette in the diagnosis of malignant disease of the body of the uterus is better known, but perhaps not so generally adopted as it ought to be. That, however, is another subject.

REMARKS ON STRANGULATED HERNIA.

By G. A. WRIGHT, B.A. (Oxon), F.R.C.S.,

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SINCE 1879 some 106 patients, with strangulated hernia, have come under my care. Of the 106 patients 31 died, a mortality which, as matters stand, is probably not above the average, but I have no hesitation in saying that such a death rate might and ought to be reduced by 50 or 75 per cent. If hernia patients were operated upon at once instead of putting off the only certain mode of relief, till exhaustion, gangrene, paralysis of the bowel with septic absorption, or peritonitis make operation too late, the mortality would fall to small proportions. If in addition to early operation the practice of taxis were abolished, the mortality of strangulated hernia would be nominal, and very few patients would die, except those whose age or degeneration of tissue rendered them incapable of bearing even a trivial injury or tolerating confinement to bed.

I have formed my opinion on observation of the physical character of the structures involved, and upon the evidence of the condition of the parts found in cases upon which I have operated, in many of whom the effects of delay and taxis have been only too evident.

I have seen an eminent surgeon put the whole strength of both his hands into an attempt to force back a strangulated hernia, and heard him call upon a bystander to supplement the pressure by squeezing with his hands superimposed upon those of the surgeon. I have read of one of our most distinguished surgeons, that after using all his strength in a like attempt, he has regretted that he had not more hands with which he might press the harder. Yet these surgeons, like all the rest of us, must often have opened the sacs of strangulated herniæ, and found within bowel black and bruised by previous efforts of taxis, while the constriction at the point of strangulation was so tight that it was an obvious physical impossibility for the swollen bowel to go back through it. When we further consider how the protruded gut is softened and sodden by the interference with its circulation, and how even at its

best it is but a delicate structure, it is not difficult to understand that a third of the patients submitted unavailingly to the process of "taxis," succumb.

I have no means of knowing what is the mortality among patients whose strangulated herniæ have been reduced by taxis without operation; statistics bearing upon this point would be interesting, but it is obvious that only the less severe cases can possibly be reduced by such means. The chief objections to taxis then are: (1) That it can only be successful in comparatively slight cases; (2) that when unsuccessful it inflicts additional injury upon already damaged bowel; (3) that if the bowel is reduced by taxis there is no means of knowing what the condition of the bowel is, and whether it is fit for a return to the abdominal cavity; (4) that in emptying the contents of the hernial sac into the general peritoneal cavity, poisonous material is very likely to be poured into the peritoneum; (5) no radical cure is attempted.

It must also be remembered that herniotomy does not in itself make any serious addition to the risks already present, while it removes all the objections just mentioned as applying to the treatment by taxis.

Of my whole series, three cases of strangulation occurred in children under or not exceeding one year old, the youngest was only three weeks old, and recovered. In one child, aged a year and a half, the hernia co-existed with a condition of extroversion of the bladder; the coincidence is common, but the existence of strangulation of such a hernia is, I think, rare.

In seven patients at least the bowel was gangrenous at the time of operation. Of these two recovered, but one of the two died after a plastic operation performed a few months later; in the other Senn's operation of "lateral intestinal anastomosis" was quite successful.

In one patient retraction of the testicle was noticed as a symptom and result of "reduction en masse."*

In one fatal case eleven inches of bowel were resected; in another the abdomen was reopened four days after the original operation, and the peritoneum washed out, with the object of arresting the course of an attack of acute peritonitis. No good result, however, followed in either case. The importance of observation of the pulse after abdominal operations was well shown in one patient. A quick pulse-beat (120) was the one only bad symptom for six days after the operation; then the woman suddenly collapsed, and died of perforation.

In a man in whom I had released and reduced the strangulated bowel I was going on to do a "radical cure," when I opened what I took to be a second sac, ligatured and removed it. The man died, and it was found that this supposed sac was really a thin-walled diverticulum of

* Details of this case will be found in the *Lancet*, March 30th, 1889.

the bladder lying in the hernia. Both the bowel and the bladder had come down as a direct hernia; there was also a pouch of peritoneum emerging through the internal ring, and following the course of an oblique hernia. This was empty. The cause of death was leakage from the bladder. This is the only case in which the operation could be considered the cause of death.

In one young man an undescended testis was strangulated, as well as a knuckle of bowel and a piece of omentum. The strangulation was not severe, and it was for some time believed that the pain and vomiting from which he had often suffered before were due to injury to the undescended testis. At the operation the true state of affairs was made out. The omentum and testicle were removed, and the canal closed. I have often wondered since whether this was a case of "torsion of the testicle" as well as strangulation. At the time of operation I was not sufficiently alive to the possibility to look for it. This is, I think, the only case in which I have delayed operation, and I did so from failure to recognise the strangulation.

In a man of 66, on his first admission in December, 1888, there was a strangulated left inguinal hernia lying in a sac behind the funicular process, which was patent as far upwards as the external abdominal ring, and contained clear fluid, as did the tunica vaginalis. At this time no right testicle was found. A radical cure was performed. Three years later he was readmitted with a strangulated right inguinal hernia; the gut lay in the funicular process, and behind it lay the undeveloped testicle. Three distinct constrictions were found in the sac. The testicle was removed, and he recovered.

The symptoms in one man were not very acute, and there was some doubt before operation whether the small inguinal swelling was the cause of the trouble. On opening the sac it was found not to contain bowel, but at the entrance of the sac was an adhesion, which evidently dragged upon and so "kinked" a coil of small intestine, and thus caused obstruction.

Once I have met with a translucent hernia in an adult. In children it is not very rare; but in adults, I should think, it is very unusual.

The cases mentioned will serve as samples of the great variety of the conditions to be met with, but scarcely a hernia is without some special feature of interest.

Of the 106 cases 52 were inguinal, 37 femoral, 8 umbilical, 1 practically inguinal, though strictly, perhaps, to be called ventral. Of eight I have no record.

Age does not seem a very important factor as regards mortality in cases of strangulation, since, as far as can be gathered from my record, the average age, exclusive of infants, of the patients who die is probably

about 60, and of those who recover is 50. It is, however, a remarkable fact that I have had no case of strangulation between the ages of 13 months and 20 years; boys and girls do not seem to have strangulated hernia.

Most of the fatal cases of hernia operated on die within three days of operation. Delay in operation means death of the patient or gangrene of the bowel, which comes to much the same thing.

However interesting statistics and curiosities may be, the one great fact remains, that death in cases of strangulated hernia is due to delay, assisted too often by "taxis." I hardly know which is worse—to consent to delay when a hernia is known to be strangulated or to use violent, repeated, and long-continued force in the attempt to reduce it. The word "taxis" itself had better be forgotten, its existence is but a cloak for bad practice.

Given then a patient, whose hernia has suddenly become irreducible, with pain in the hernia, or at the umbilicus, and vomiting or nausea, I should *at once* give chloroform, and if a momentary gentle squeeze did not reduce the previously reducible gut I should operate. All other symptoms are outweighed in importance by these three—a sudden appearance or sudden increase in the size of a hernia—pain either in the hernia or about the umbilicus, and nausea.

All other modes of treatment than operation are untrustworthy; they may occasionally succeed, they will far more often fail, and if they do fail irreparable harm may be done by their trial.

My insistence is not uncalled for, it is no buried error I am unearthing. Delay in the treatment of hernia and "taxis" are as common now, or nearly so, as they were twenty years ago. I do not know who is to blame. I know it is sometimes the patient, who will not submit to operation; I fear it is sometimes the practitioner, who does not sufficiently insist, and I know practitioner and patient and surgeon are all sometimes guilty of prolonged and violent attempts at reduction.

In examining the post-mortem records of my cases, in a certain number I found mentioned, as the local lesion, a mere congestion of the portion of bowel constricted without any evidence of general peritonitis. Where there is a general peritonitis, or where the patient dies of "shock" or distension and paralysis of a large part of the intestinal canal, there is no difficulty about the cause of death, but where the symptoms during life are merely those of gradual failure of power in a patient whose "organs are not bad," and at the autopsy nothing more is found than injection of a few inches of bowel, it is difficult sometimes to account for the failure. I have for some time believed that these cases die of septic absorption through the wall of the injured bowel, and Mr. Treves has given a similar explanation.

Clinic.

CASE OF PAPILLOMA OF BOTH OVARIES AND TUBES WITH LARGE AMOUNT OF ASCITES: OPERATION: PERMANENT CURE.

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WHEN entering the out-patient room at the Southern Hospital on the 18th of January, 1889, I met a patient going out who had just been seen by the house-surgeon and advised to apply for treatment at a general hospital or dispensary. She was supposed to be an unsuitable case for a women's hospital. Something in the patient's expression and appearance—especially the *facies ovariana*—induced me to stop her and make some inquiries; and she was in consequence sent to the hospital for careful examination, and ultimately admitted as an in-patient for operation.

Mrs. M., æt. 34, married, no children, well-developed, thin, ailing, no cachexia: Said she had noticed a swelling of the abdomen about six months ago. It was observed first about the epigastrium, not as if growing from the pelvis; but there had been uneasiness in the pelvis for many months. Menstruation had been always regular. No history of acute illness immediately before or since the appearance of the swelling. She had been to several hospitals and dispensaries, and had been treated, as she understood, for disease of the liver among other ailments.

The abdomen was greatly distended, and no disease of liver could be made out. The urine was normal, and there was nothing in her appearance or on examination suggesting organic heart disease. Examination of the abdomen gave the usual signs of ascites. There was fluctuation everywhere, but no solid mass in the abdomen. Examination *per vaginam* revealed the presence of the uterus in its normal position. There was some diminution in the normal mobility of the uterus; on each side and behind the position of the broad ligaments there were indefinite partially movable masses, suggesting to the touch irregularity of shape and a certain amount of fixedness; they did not float in the fluid. There was no pain in pressing upon and manipulating these masses. The uterus was found to be slightly enlarged.

Considering the negative results of investigation into the ordinary causes of ascites, the large amount of fluid, and the history of uneasiness in the pelvis at an early stage of the ailment, and also the positive

results of exploring the pelvis, it was decided that there was an overwhelming probability in favour of papilloma of ovaries and tubes ; and on this diagnosis action was taken.

Operation, January 26, 1889.—Present, amongst others, Dr. Carneross, who had taken an interest in the case, and knew the conclusions arrived at. Median incision : carried low down into mons veneris. Peritoneum found thickened, innermost layer with dark appearance before incision owing to fluid showing through, as in operation for ruptured tubal pregnancy. Incision through small portion, escape of dark-coloured fluid, like decomposed black blood and water. Ovariectomy trocar used to carry off the fluid and permit slow emptying of abdomen. Quantity of fluid drawn off by apparatus amounted to 24 pints. Incision through thickened peritoneum carried down to bladder. Position of bladder ascertained by sound. Fingers inserted through wound detected papillary degeneration of parts about both broad ligaments. Uterus clear of growths ; apparently normal in size and consistence, and in normal position. There was a wide cavity in the pelvis containing fluid, the bowels being retained high in the abdomen. Peculiar omental adhesions which came in the way had first to be dealt with. There were two long bands on the right side which came from some point not made out, but apparently adherent to anterior parietes above reach, and inserted into the peritoneum in right side of the pelvis about the level of the upper margin of the broad ligament : they were broad above, round in the middle, and very smooth, as if covered with peritoneum, and they were flattened out at their point of attachment below. A much larger and longer one was dealt with just at the last. This came down in the middle line, and was adherent to the fundus of the bladder. The right broad ligament first received attention. The tumour consisted of large handfuls of cauliflower material extending along the upper margin of the broad ligament, and filling the right half of the pelvis behind it. String-like adhesions to the extreme right and behind, low down, were torn through. A rounded smooth body, suggesting ovary or ovarian cysts, was discovered lying low in the bottom of Douglas, and firmly adherent posteriorly. The adhesions were torn through with some difficulty ; this finally liberated the mass, and made its elevation to the external wound possible. It was now found that the Fallopian tube and ovary could not be distinctly identified. Only about one inch of the tube at the cornu of uterus was fairly normal. This was ligatured and seized with medium-sized pressure forceps. Then the mass was gradually enucleated from the upper part of broad ligament. Several silk and many silk-worm gut ligatures were used. The posterior surface of the broad ligament was found to be rough after the removal of the mass, and was studded with some suspicious minute nodules, but the whole of

the papillomatous tissue was removed with the upper portion of the broad ligament. Considerable hæmorrhage occurred during this part of the operation, apparently chiefly from the lacerations made in separating parts bound together by organised adhesions. The left side had now to be dealt with. It was found to be in very much the same condition as the right. A large mass lay down and well to the left suggested more the presence of an ovary than did the right. There was a normal part of the Fallopian tube near to the uterine cornu, as on the other side; but outwards from this the parts were unrecognisable owing to masses of papillomatous substance bathed in a soft, tenacious, slimy fluid. Cornu seized as before, and the ligaturing was carried outwards step by step, short incisions being made through the healthy tissue beneath the papilloma, and then the wounds were immediately closed by silkworm gut, bringing together the anterior and posterior surfaces of the broad ligament. No attempt was made to form a pedicle, consequently there was no tension on the ligatures. The partially separate mass, which suggested transformed ovary, required a separate series of ligatures and sutures after some adhesions had been broken down. Finally all diseased tissue was removed. A considerable ooze of blood continued, and although irrigation with saline solution was prolonged the returning fluid continued to be too much coloured. The parts were examined, and the source of the ooze from the right broad ligament was found. Fresh stitches were introduced, and the flushing repeated. This effected thorough washing away of clots and detached portions of papilloma, and the hæmorrhage ceased. The object which was adherent to the bladder was now attended to. It should have been removed at the first. It came from above the abdominal wall, and when drawn down it was found to be spread out, and consisted of three heads or bands, which seemed like condensed omentum, and, in fact, was omentum. These were tied, separated, and cut below the ligature. They appeared to be very vascular. The middle third of the structure was round, and covered by a smooth, shining coat, which looked not unlike the ordinary peritoneal covering of an organ. Lower still it tapered, but retained the same characters, only becoming denser, and then, near the fundus of the bladder, it expanded like the web-foot of a duck. It was ligatured at its lower end and cut away.

The operation was concluded by the insertion of a large glass drainage tube to the floor of Douglas's space and closing the wound in the usual way.

Fluid withdrawn through the tube after completion of the "toilet" did not indicate hæmorrhage to any important extent.

Dressing.—Plug of perchloride tow in tube; a round tube and over wound cotton wool wrung out of perchloride of mercury solution.

After patient was put to bed, pulse 80, good.

8 p.m. Pulse 84, regular, good. Patient had been in great pain until morphia administered. Just received third hypodermic of one-fourth grain.

January 27, 8 a.m. Pulse 80, temperature, 98°. Patient slept fairly well, but vomited several times during the night. 8 p.m. Pulse 84, temperature 98·4°. The syringe was used with salt solution during the morning, when a large quantity of blood-stained fluid was drawn off. Hæmorrhage from uterus commenced in the morning. Patient slept and was comfortable during the day.

January 28, 8 a.m. Pulse 90, temperature 98·6°. Patient slept fairly well during the night. 8 p.m. Pulse 98, temperature 98·6°. The syringe was used with salt solution at 11-15 a.m., when a large quantity of fluid, blood-coloured, was drawn off. Patient vomited after the syringing, and had severe pain, but was relieved by hypodermic injection of one-fourth grain morphia. Syringe again used at 6-15 p.m., but much less fluid washed out.

January 29, 8 a.m. Pulse 90, temperature 98°. Patient slept well during night. 8 p.m. Pulse 102, temperature 99°. During the day a large quantity of blood-coloured fluid came through the tube. At 2 p.m. one-half grain calomel powder was given, and repeated every two hours; in the evening a soap and water enema; bowels slightly moved.

These details give an example of the chief features of the convalescence. Much fluid came away for a considerable time; the cavity of the pelvis being unoccupied by intestines, which were held up by the same pseudo-membrane as covered the omentum. This fact, observed in other cases, makes drainage essential. There was an unusual amount of pain, but there never was any rise of temperature or abnormal quickening of the pulse. A rubber drainage tube had to be kept in for several weeks, and a sinus was thus formed through which, for several months, at the menstrual periods, there was a large amount of discharge. For over a year there was considerable thickening and hardness in the floor of the pelvis, but the patient's health improved from the first, and there was no distress from bowels or bladder.

The patient was seen at intervals until twelve months ago, when she was apparently in good health. The thickening in the pelvic floor had completely disappeared, the uterus was movable, and, in fact, nothing abnormal could be made out either as anatomical change or functional distress.

CHRONICLE.

Medicine.

UNDER THE CHARGE OF JULIUS DRESCHFELD, M.D., F.R.C.P.

DANA (C). "Some new observations upon the causes, mode of onset, and prognosis of apoplexy."—*Medical Record*, No. 8, 1895.

DANA'S observations are based on 182 cases, of which 82 were fatal. Under the term "apoplexy" the author includes "all those sudden vascular lesions which lead to a stroke," and which "are followed as a rule by some form of hemiplegia"—i.e., cerebral embolism and thrombosis, as well as hæmorrhage. From a review of the histories of 182 cases the author concludes that apoplexy and hemiplegia occurring in early life are much more frequently due to syphilis than to embolism, and that syphilis is a factor in a third of all apoplexies, at least in large cities. Apoplexy is increasing in frequency, owing partly to the facts "that more people live to the apoplectic age; that there is a larger urban population, with all that that implies in regard to the use of alcohol, the prevalence of syphilis, and the greater intemperance in eating and working. Apoplexy does not specially affect brain-workers if they live temperately, but rather spares them." Of all the exciting causes of fatal strokes, alcohol is the most potent. Amongst Dana's cases very few attacks occurred during great mental or bodily strain. In 47 cases, 13 occurred at night during sleep or sleeping hours. Most of these were thrombotic, and 10 were syphilitic. None of the fatal cases of hæmorrhage occurred during sleep, and the author doubts if arteries really rupture at that time. The frequency with which attacks occur in the morning, after breakfast, or in the evening, is somewhat noteworthy. Few cases occurred in the middle hours of the day. The cases of apoplexy which occurred after parturition all took place within eight days, and occurred usually in the morning and during some slight physical effort. Hæmorrhages occur in the morning most frequently; next, in the evening; rarely during the day or during sleep.

Apoplexy is sometimes a conservative agent, calling a halt to excessive activity and intemperate living, and actually prolonging life. About one fourth of those stricken with apoplexy die from the attack (hæmorrhages being the most dangerous; thrombosis, especially syphilitic, being least so). The average duration of life of those who live

and survive one attack is over five years. The chances of a second attack before the fourth year are always considerable, yet do not amount to 50 per cent, and are inconsiderable so far as hæmorrhages are concerned. Thromboses are much more apt to recur than hæmorrhages.

CATHOMAS (J. B.). "On sudden vascular occlusion in influenza."—*Münchener medicinische Wochenschrift*, July 2, 1895.

THE author first refers to a number of cases, recorded in medical literature, of affections of the circulatory system following influenza, viz., phlebitis, slow action of the heart, pericarditis, endocarditis, venous thrombosis, embolism following the cardiac disease, and arterial thrombosis. Leyden and Guttman refer to eight cases of the later complication in their work on influenza. The arteries affected were—one popliteal artery in four cases, both popliteals with the symmetrical gangrene in one, thrombosis of the femoral artery with gangrene of the extremity in one case; in another case there was thrombosis of the brachial artery; and thrombosis of the cerebral arteries has been repeatedly observed.

The author then reports in detail two cases from the Zürich Medical Clinic. The first case was one of influenza with bronchitis, followed by broncho-pneumonia of both lungs. Suddenly symptoms of arterial obstruction developed in the right arm, and were followed by gangrene of the forearm. Post-mortem examination revealed lobular pneumonia, thrombosis of the innominate artery, with prolongation of the thrombus into the axillary and brachial arteries. Also thrombosis and atheroma in the aorta was present. In the second case, following influenza, symptoms of vascular obstruction developed suddenly after a fit of coughing. Both legs became blue-black in colour, the arterial pulsation disappeared; there was also loss of sensation with diminished temperature. Gangrene followed. Though no autopsy was obtained, the author thinks the symptoms were due to arterial thrombosis.

From a review of these cases, and of others recorded in literature, the author concludes that in the course of influenza, as in other infectious diseases, vascular occlusions may occur. This complication may be due to embolism or to venous or arterial thrombosis. Arterial thrombosis, which is a rare complication of influenza, may have a quick and sudden onset like arterial embolism.

EICHHORST (H.). "On the relation between serous pleurisy and tuberculosis."—*Correspondenzblatt für Schweizer Aertze*, July 1, 1895.

THAT there is a certain relation between tuberculosis and serous pleurisy has long been recognised. Patients who have suffered from serous pleurisy frequently become tubercular. Of fifty-four cases of idiopathic

pleurisy recorded by Barrs, eighteen, or 33·3 per cent died of tuberculosis of the lung within five years. Of ninety-one cases of pleurisy recorded by Fiedler, only twenty-one (or 22·8 per cent) were free from tuberculosis at the end of two years. But since tuberculosis and pleurisy are both common diseases, it is somewhat difficult to say, from clinical observations alone, in what proportion of cases the occurrence of tuberculosis is merely accidental. Hence, pure clinical observations are insufficient. Bacteriological examination is of service, since every pleuritic effusion in which tubercle bacilli are found, may, with very rare exceptions, be pronounced to be tubercular. But, unfortunately, the exudation cannot be declared to have no connection with tuberculosis if the bacilli are not found; and the detection of bacilli in pleuritic effusion presents considerable difficulties. The author thinks that the relation between tuberculosis and serous pleurisy can only be satisfactorily solved by the combination of clinical observations and experiments on animals, and hence he has employed the following method. Every case of exudative pleurisy admitted into his clinic has been explored with a hypodermic needle within the first three days, and the fluid withdrawn immediately injected into the peritoneal cavity of a guinea-pig. The animal has been allowed to live six or eight weeks, then killed, and the internal organs carefully examined. At first the author withdrew only one gramme of fluid from the pleural cavity. From the earlier cases it appeared that serous pleuritic effusion was only rarely connected with tuberculosis, since in eleven cases of pleurisy the puncture fluid of one only produced tuberculosis of the lymphatic glands in the guinea-pig.

Grawitz has obtained similar results (one in ten). But the author was surprised to find, that only negative results were obtained by inoculation of a guinea-pig from a case of serous pleurisy, in which signs of marked tuberculosis afterwards developed. Hence he came to the conclusion that there must be some defect in the method of experimenting.

Since it is difficult to find tubercle bacilli in pleuritic effusion, and since they are very scanty when present, it appeared to the author, that the failure in the experiments on guinea-pigs might be due to the injection of too small a quantity of pleuritic fluid, and therefore he decided to use larger quantities of fluid. He employed for this purpose a larger syringe, which was capable of holding 15cc., and which could be easily sterilised in all its parts.

He then examined twenty-three patients in whom serous pleurisy had developed, without any apparent cause, whilst they were in good health. In these cases no tubercular disease could be detected in any organ. The pleuritic effusion (15cc.) from each case was injected into the

peritoneal cavities of a guinea-pig, with the result that in fifteen out of the twenty-three cases, i.e., in 65.2 per cent, tuberculosis was produced, and only eight animals, 34.8 per cent, remained free from tuberculosis. Hence, from these experiments it is evident that two-thirds of the cases of serous pleurisy were tubercular in nature.

The author thinks that this proportion is too small rather than too great. Thus, a patient suffering from serous pleurisy, developed marked tuberculosis two months later, though inoculation experiments produced no tubercular disease in guinea-pigs at the onset. In five cases of phthisis, with serous pleuritic effusion, the inoculation experiments in each case produced tubercular disease.

Eichhorst thinks that tubercular serous pleurisy has its origin more frequently in tuberculosis of the bronchial gland than in latent tuberculosis of the lungs. Also cases of primary tuberculosis of the pleura occur.

The above results are necessarily of great importance with reference to the prognosis of treatment of serous pleurisy.

The author also remarks that in 27 cases of spontaneous exudative pericarditis treated in his clinic, 8 (or almost one-third) were tubercular.

Eichhorst's observation and experiments show clearly that two-thirds of all cases of serous pleurisy are of tubercular nature, and that the tubercular poison is present from the onset. *R. T. Williamson.*

Surgery.

UNDER THE CHARGE OF THOMAS JONES, M.B., B.S., F.R.C.S.

HORSLEY (VICTOR). "Five cases of leontiasis ossium: in three of which the disease was removed by operation."—*Practitioner*, July, 1895.

PROFESSOR HORSLEY restricts the term "leontiasis ossium" to a development of bony new formation resembling an overgrowth of diploë, and attacking the cranial bones (by preference the frontal).

In all the five cases described the condition began in childhood or early youth. In the three cases in which the disease attacked the eyebrow and roof of the orbit early, the displacement of the eyeball downward occurred before any notable swelling appeared above in the supra-orbital ridge. In these cases also the region of the external frontal process was the focus of the malady.

In no case was there any evidence of syphilis, and no really direct history of traumatism.

The prominent symptom of distress was the pain produced by entanglement of and pressure upon branches of the fifth nerve.

In the cases where operation was possible the mass was readily removed piecemeal, starting from the border of conjunction with healthy bone. The limits of the tumour could be readily recognised by the difference in appearance, the diseased part being highly vascular.

The outer surface of the tumour was smooth in every case, and the periosteum thickened. On stripping this off the diseased bone presented a marked contrast to the normal, in being notably more vascular, the surface being extensively pitted with minute foramina, the branchings of superficial vessels very prominent, and the colour a deep red as compared with the pink-white of normal bone.

Mr. Horsley describes the microscopical appearances, and gives sketches of sections.

He considers that his cases show that "there is a pathological entity in which both osteoplastic and osteoclastic processes are represented, and that it is a hopeless condition for which operation, if extensively practised, offers considerable relief."

McCOMAS (A. R.). "A case of abscess of the brain, with removal of a cerebral hernia."—*International Medical Magazine*, May, 1895.

A PATIENT, aged sixteen, a coal miner, was struck on the back of the head by falling slate, forcing his head down upon a bolt, which caused a laceration of the scalp and a compound fracture of the left frontal bone, just above the orbit. A physician was called who stitched up the external wound. Some weeks later he was taken ill, complaining of chilliness and pain in the back of the head. There was no paralysis; pulse 58, temperature 101.4°. The author saw the case, diagnosed abscess of the brain, and advised immediate operation. Consent was at first refused, but two days later the patient had a convulsion, and became comatose. An operation was performed; two lines of fracture were found, with a piece of bone driven into the brain substance. This fragment could not be removed with the elevator, and the trephine was applied. The opening was enlarged by the removal of several fragments, and then an irregular-shaped piece of bone, weighing 16 grains, was got away. About 3 ounces of pus were removed, the wound irrigated, drained, and closed. Four days later, as the pain in the head was severe, and nausea and vomiting were present, the bandages and sutures were removed and the cerebral hernia allowed to form. Iron was given freely, and the patient gradually improved. Afterwards, in about a month-and-a-half, the hernia was removed by transfixing the base with a needle carrying a double thread. Each half was ligatured separately

the hernia excised, and the wound closed. Within a month the wound was healed, and sixteen months later there was no apparent sign of mental derangement, except slight loss of memory.

ESKRIDGE (J. T. and McNAUGHT (F. F.). "Traumatic cyst of the brain from an injury received twenty-five years before. Epilepsy; operation; recovery."—*New York Medical Journal*, June 1, 1895.

THE patient, when nine years of age, was kicked on the head by a colt, sustaining a fracture of the skull, with loss of brain substance. The depressed bone was not elevated, but the soft parts stitched together. The patient soon recovered consciousness, but there was some mental disturbance for a time. He can recall nothing that occurred for eleven months after the accident. His health remained good up to his nineteenth year, when he began to complain of constant headache, and occasional attacks of unconsciousness. At the age of 25 he had a convulsive attack, brought on by alcoholic indulgence. After that memory and self-control seemed weakened, and he became more irritable. On September 6, 1894, he had a severe convulsion, and remained unconscious for 36 hours. Convulsions recurred on the second, third, and fourth days. Shortly after he was seen by the authors, being then in a semi-unconscious condition.

An operation was performed, discovering an old triangular fracture, with the apex of the triangular piece of bone depressed deep into the brain substance. Connected with this was a cyst, about $2\frac{1}{2}$ inches long by $1\frac{1}{2}$ inches broad, containing a straw-coloured watery fluid. The walls were firm and fibrous. The contents of the cyst were evacuated, the inner surface of the sac scarified, and the cavity packed with iodoform gauze. At the end of eight days the cavity was found practically obliterated. The patient's mental condition rapidly improved; but on two occasions since the operation, after indulgence in alcohol, he had convulsions, but much less severe than those before the operation. The authors believe that this shows that, after getting rid of the original cause of epileptic seizures, fits may recur from trivial excitants. Probably the presence of a foreign body in the brain for a length of time gives rise to structural changes in the surrounding brain substance, and perhaps interferes with the normal functioning powers of the cells of the entire brain, leaving an unstable and weakened condition. Besides, a thickened and inflamed state of the meninges may persist for some time.

After operation, the same precautions to avoid exciting causes should be taken for some time, as before it. Bromides might be used also for a lengthened period to lessen the abnormal irritability of the brain cells.

GRAHAM (J. E.). "Primary carcinoma of the gall-bladder."—*Canadian Practitioner*, May, 1895.

PRIMARY carcinoma of the gall-bladder and biliary passages is not so rare as one might suppose, as is well shown by the statistics collected by Musser and Norman Moore in regard to new growths in internal organs. Dr. Graham records a case of a man who had suffered for years from "bilious attacks." The chief symptoms were nausea and vomiting. On coming under observation he was weak and emaciated, slightly jaundiced, but with no pain or vomiting, liver enlarged and tender on pressure, fæces grey and sticky, containing fat as well as indol and bacteria. The liver increased in size rapidly up to the patient's death. The diagnosis of primary carcinoma of the liver or gall-bladder was made during life for the following reasons:—(1) There was no history of primary cancerous disease in the pylorus, cæcum, sigmoid flexure, or rectum. (2) There was a history of biliary colic, with inflammation of the biliary passages. (3) The absence of marked jaundice excluded primary cancer of the biliary passages. At the post mortem, a cancerous mass was found, originating in the gall-bladder, with secondary growths in the liver.

JORDAN (LLOYD). "On the localisation of gallstones, and the several operations for their removal from the biliary passages."—*Birmingham Medical Review*, April, 1895.

THE diagnosis of gallstones is frequently made now in cases where they would have formerly been absolutely unsuspected. The author believes a step further may be taken in the localisation of the calculus, as the general diagnosis of gallstones is insufficient to indicate the treatment appropriate to any one case.

We know little of the causes of cholelithiasis. The calculi commonly originate in the gall-bladder, small masses of mucus being frequently their starting point. Tight lacing seems to be a pre-disposing cause, as they are more frequent in women.

Gallstones often lie harmless in the gall-bladder for years, but usually sooner or later they set up a cholecystitis, sometimes very acute, gradually leading to a chronic condition, which ultimately causes almost entire obliteration of the cavity of the gall-bladder, which is a circumstance to be borne in mind in operating in such cases.

Gallstones may prove fatal from the following causes:—Exhaustion, cholæmia, collapse during an attack of colic, peritonitis, pylephlebitis, hepatic abscess, intestinal obstruction, and cancer.

Gallstones are frequently found post mortem where they were never suspected during life, and the author believes cholelithiasis to be one of the most commonly overlooked disorders, the attacks being often mis-

taken for other quite different affections, or passed over by the use of some meaningless term denoting one of the symptoms. Paroxysmal irregular pains in the abdomen, starting either in right hypochondriac or epigastric regions, and radiating upwards to shoulder tip, or back to the scapular region, and often accompanied by nausea, vomiting, or even collapse, are characteristic of gallstones. Fulness is often complained of, with anorexia, etc.

Jaundice is not an essential symptom, and is often conspicuously absent. The finding of gallstones in the excreta is positive evidence, but their absence teaches us nothing. Pyrexia is met with when inflammatory processes are present. Local tenderness is a sign of high value. Stabbing pain on percussion over the hypochondrium is also suggestive of calculus.

Gallstones may be met with in six different conditions, and these may be placed in two groups: first, those in which the walls of the gall-bladder are yielding, allowing of its distension, and secondly, those in which the walls are contracted, indurated, and indistensible.

In the first group are placed No. 1, in which the stone lies in the gall-bladder: here there are attacks of colic, but usually no tumour, no jaundice, no pyrexia; No. 2, in which the stone lies in the cystic duct, usually giving rise to colic and presence of a tumour formed by the distended gall-bladder; No. 3, in which the stone lies in the common bile duct, giving rise to cases characterised by colic, tumour, jaundice, and sometimes pyrexia. In the second group, in No. 4 the stone lies in the shrunken gall-bladder or cystic duct, and this is the most difficult condition to diagnose. It may be suspected, where paroxysms of pain are frequently recurring, and where pyrexia and local tenderness are present. In No. 5 the stone is in the common bile duct, which is thickened and dilated, whilst the gall-bladder and its duct are shrunken and indurated: the author considers this the most interesting condition: its diagnostic recognition we owe to Dr. Osler, of Baltimore. The symptoms are paroxysmal hepatic colic, well-marked ague-like attacks, characterised by chill, sweating, and fever, chronic jaundice of varying intensity, deepening after each paroxysm and fading during the intervals. In No. 6 the shrunken gall-bladder is packed with stones, and a calculus is present in the common duct. This condition gives rise to similar symptoms to those of No. 5, and can only be recognised at the time of operation.

Mr. Jordan Lloyd then refers to the operative procedures practicable in the different conditions.

In No. 1, with a stone lying free in the gall-bladder, the operations applicable are cholecystostomy, cholecystotomy, cholecystectomy, and cholecystenterectomy. The author prefers cholecystostomy, which he

differentiates from cholecystotomy, reserving the latter name for an operation by which the gall-bladder is opened and returned into the abdominal cavity without stitching to the fascia of the rectus and without insertion of a drainage tube.

Cholecystectomy and cholecystenterostomy are more dangerous and unnecessary measures. When a stone is impacted in the cystic duct, as in No. 2, the same operations are feasible, but in addition choledochotomy or choledochotomy may be called for. Cholecystostomy should be tried first. Often the stone in the cystic duct may be squeezed back into the gall-bladder more readily before the latter is opened.

The condition No. 3 is less common and may be dealt with as No. 2, but the operation is more difficult on account of the distance of the calculus from the gall-bladder.

In No. 4 we have a condition in which the gall-bladder is so contracted that it cannot be sutured up to the abdominal parietis. Cholecystostomy is therefore impracticable; cholecystotomy with suture of the opening in the wall of the gall-bladder is possible, but both difficult and dangerous; cholecystectomy might sometimes be tried. Cholecystenterostomy is impracticable by mechanical apparatus, such as Senn's plates or Murphy's buttons, and anastomosis with simple suture is out of the question. Choledochotomy or cholecystotomy, *without* suture, are the most efficient procedures in this type of case. Free and perfect drainage is necessary, and it may be advisable, as also in conditions 5 and 6, to drain the right lumbar peritoneal pouch by a tube through the abdominal wall in the lumbar region, just below the lower end of the right kidney.

In treatment of Nos. 5 and 6 choledochotomy and choledochotomy are the only operations applicable, and the author favours the more radical procedure of choledochotomy. It is a waste of time to attempt to suture the duct; tamponing with iodoform gauze and free drainage are necessary.

Francis J. H. Coult.

Midwifery and Diseases of Women.

UNDER THE CHARGE OF W. J. SINCLAIR, M.A., M.D.

EDGAR (J. C.): New York. "Deep incision of the parturient cervix for rapid delivery."—*American Journal of Obstetrics*, June, 1895.

FOUR years ago Dührssen stated that "in all cases in which the defective dilatation affects only the vaginal portion of the cervix, and grave danger threatens mother or child, it is to-day the duty of every obstetrician who

is skilled in diagnosis, technically expert and antiseptic, to dilate the os completely by from two to six deep incisions reaching as far as the attachment of the vagina, and deliver the patient." Though Dürrssen applied this treatment successfully in thirty-five cases, saving all the mothers and all but two of the children, he has latterly restricted the scope of the operation, employing it only in cases of extreme emergency. Charpentier from the first was an opponent, basing his opposition on statistics obtained from an analysis of 454 cases of eclampsia, which yielded the following mortality table:—

Mortality from spontaneous labour	13.93 per cent.
" " artificial labour	29.13 "
" " Cæsarean section	36.26 "
" " forced labour	40.75 "

Cæsarean section is objectionable by reason of its high mortality. Mechanical dilatation of the cervix, followed by extraction of the fœtus—the method commonly used at the present day—requires time (from forty to ninety minutes) and may result in lacerations, or fail altogether. When the supra-vaginal cervix has disappeared, deep cervical incisions, varying in number from two to six, permit of the emptying of the uterus in five or ten minutes. Where the supra-vaginal cervix persists, it must be made to disappear by preliminary mechanical dilatation; this may be sufficient by itself in multiparæ, and, indeed, is to be preferred, unless the emergency is great and grave danger threatens mother or child. In such emergencies, and in primiparæ, mechanical dilatation should be followed by deep incisions. These incisions must reach as far as the utero-vaginal junction, and then laceration does not increase the length of the wounds, as it inevitably does where insufficiently deep incisions are made, as testified by the experience of Skutsch, who was obliged to abandon his method of multiple superficial incision of the cervix on this account. It must also be insisted on that the supra-vaginal cervix be fully dilated, so that the vaginal portion of the cervix represents the more or less thick and broad border of the external os.

The author relates three cases at length: two mothers and all the children were saved. In the fatal case the patient was comatose at the time of operation. The author believes the field for the operation will prove to be limited, whilst its recent introduction prevents any definite conclusions being yet drawn regarding it.

BALDY. "Abdominal section for puerperal septicæmia."—*American Journal of Obstetrics*, July, 1895.

In this paper Dr. Baldy gives an account of the various conditions in which abdominal section for puerperal septicæmia is advisable. He

points out that the removal of appendages containing pus during the puerperium has been established as the best practice. It is immaterial whether the pus has formed antecedent to pregnancy or after parturition.

There are a large number of cases in which, as a result of infection, the tube and ovary are surrounded by exudation. It is often difficult to say if pus is present. If this is doubtful the best policy is to delay operation, meanwhile watching the case carefully.

If infection has set up septic peritonitis the result depends on whether the inflammation is localised or general. An exploratory operation is advised. If a localised intra-peritoneal abscess is found, the finger should be passed in to ascertain the condition of the tubes. If these are not involved, the abscess cavity should be drained. This has many times been done successfully.

In cases of general septic peritonitis, there has been up to the present no successful operation recorded.

With regard to cases of puerperal cellulitis, there is great difficulty in deciding whether suppuration has occurred or not. In the latter case, of course, no operation is required.

In the suppurative group, with infiltration of the pelvic floor and the broad ligaments, Dr. Baldy recommends that hysterectomy should be performed. The entire infiltrated area cannot be removed, but the remainder is left in the most favourable condition for drainage.

The disease is always local at first, and tends to cause death by the absorption of septic material. There are cases also in which no definite local disease can be found on examination, but in which absorption is taking place from the cavity of the uterus. There may be an offensive discharge. If curetting and the application of carbolic acid, with drainage by gauze, do not bring down the temperature and pulse, early hysterectomy probably affords the best chance of life.

In all these cases it is essential to success that the operation should be done early, *i.e.*, within the first week or two.

The greatest care and discrimination is required in deciding for or against this operation. Clinically the diagnosis between the different varieties of infection is not easy, many of the cases being of a mixed nature.

Dr. Baldy gives a list of nineteen hysterectomies done in America during the puerperal state. In seven cases the operation was successful: but, as he states, many of the unsuccessful cases have probably not been recorded. The operation was done at intervals varying from three days to one month after delivery.

He regards these results as encouraging, but admits that the field for hysterectomy in puerperal cases is not a large one.

GUINARD. "The diagnosis of dermoid cysts of the ovary."—*La Gazette de Gynécologie*, January, 1895.

DR. GUINARD calls attention to certain features in dermoid tumours of the ovary which, he states, should in the majority of cases enable us to make a certain diagnosis before operation. He points out that text-books do not give any method of differentiating dermoids, in fact, most authorities state that they can only be diagnosed by exploratory puncture, which is hardly ever justifiable.

The diagnostic signs are: (1) The size of the tumour, and its mode of growth. A dermoid always grows slowly, and is rarely of large size. (2) The age of the patient. Dermoids are usually found in women who are still young; they are also the commonest variety of ovarian tumour found in young girls. (3) The presence of spontaneous pains. Dr. Guinard states that pain is a very constant accompaniment of ovarian dermoids, whilst it is rarely met with in multilocular cysts. This feature was first pointed out by Lawson Tait. This may possibly be attributed to the frequent torsion of the pedicle. Dermoids are generally more mobile than other varieties of cysts, and are hence more liable to get twisting of the pedicle.

No one of these signs is in itself sufficient to make a diagnosis; it is only when they are associated together that a definite conclusion can be formed.

Several cases are quoted in support of these views.

In three cases the diagnosis was correctly made before operation.

In another case a girl aged 13 was operated upon whilst suffering intense abdominal pain and vomiting. She had a hard, mobile, abdominal tumour, the size of a foetal head. This was found to be a dermoid, with the pedicle twisted several times on its axis, the acute symptoms no doubt being due to the torsion. She was found, on inquiry, to have had abdominal pains for a year.

In the last case quoted, a diagnosis of ovarian dermoid was made by the aid of the above-mentioned signs, and laparotomy showed that it was a simple cyst, with the pedicle twisted on itself three times.

It is thus evident that although the signs laid down may be of considerable value in diagnosis, they are not absolutely reliable, and that at any rate simple cysts with twisted pedicles may cause precisely similar symptoms.

CARSTEN. "Accouchement forcé."—*American Journal of Obstetrics*, March, 1895.

AN account is given of the method of inducing abortion or premature labour, which is always adopted by the author. He claims that it is "painless, effective, and safe," and contrasts it with other methods.

In the early months of pregnancy the procedure is as follows:—Chloroform is given to the full extent. The cervix is rapidly dilated with Goodell's dilator up to a diameter of an inch or more; the finger is now introduced, and the uterus rapidly emptied of its contents. Occasionally it is necessary to use the blunt curette for shreds of membrane. The uterus is swabbed out with carbolic acid solution.

If the pregnancy has advanced to six months or later, the cervix is similarly dilated, and then a Barnes' bag is put in. The patient is allowed to recover from the influence of the anæsthetic, and labour is permitted to go on naturally.

Strict aseptic and antiseptic precautions are always taken, and then only can the operation be considered absolutely safe. Dr. Carsten gives notes of four cases as examples, in which his method was used with perfect success.

BERNAYS. "A case of hysterectomy for the removal of an enormously large degenerated and suppurating myoma."—*American Journal of Obstetrics*, March, 1895.

THE following remarkable case is recorded by Dr. Bernays.

A patient, aged 48, had a myomatous tumour of the uterus for sixteen years. She had reached the menopause, but latterly the tumour had been growing more rapidly than before.

When seen she was extremely emaciated, the abdomen was distended by an enormous tumour, and vaginal examination showed that a solid mass filled up the pelvis. The abdominal portion of the tumour fluctuated distinctly. The urine contained traces of albumen, and the lower extremities were very œdematous. It was decided to attempt the removal of the tumour. The abdomen was opened, and the tumour was found to be a myoma. An incision was made into its wall, and an enormous quantity—six gallons—of offensive pus was evacuated.

The left broad ligament was now tied. On the right side, however, a large extra-peritoneal mass was found. In enucleating this from its capsule, the right ureter, which was stretched over it, was torn across, about six inches below the kidney. The two ends of the ureter were sutured to the skin of the abdomen. The tumour was now separated and brought forward. A pedicle was made of the cervix, which was fixed in the lower angle of the wound. A large tube was passed into Douglas' space.

The convalescence was tedious. The entire vesical end of the right ureter sloughed, causing a large extra-peritoneal abscess; this was opened by the lateral abdominal incision and drained.

A vesico-peritoneal fistula now formed, urine coming away through the tube in Douglas' space. This, however, closed spontaneously at the

end of several weeks. Seven weeks after the operation the patient went out well, with the exception of a uretero-abdominal fistula draining the urine from the right kidney.

Two months later she returned to the hospital, and the right kidney was successfully removed by lumbar incision. At this time the urine from both kidneys contained one-tenth of albumen, and a few hyaline casts. However, in spite of this the patient recovered completely.

The right kidney was found to be the seat of interstitial nephritis.

Arnold W. W. Lea.

Pharmacology and Therapeutics.

UNDER THE CHARGE OF D. J. LEECH, M.D., D.Sc., F.R.C.P.

DUNSTAN and BOOLE.—“Vesicating constituent of croton oil.”—Abstract in *Pharmaceutical Journal*, Vol. LV., p. 5.

THE authors have been able to separate from croton oil, and also from the so-called croton-oleic acid, a resinous substance having the vesicating properties of croton oil. To isolate this substance, that portion of the oil readily soluble in strong alcohol is saponified by means of lead oxide and water. The dried salts obtained are dissolved in alcohol, and repeatedly fractionated from this solution by addition of water, the last fraction being a lead salt (?) of the vesicating resin. It is a hard, pale yellow substance, nearly insoluble in water, light petroleum, or benzine, but readily soluble in alcohol. Chemically, it is an indifferent substance, having the formula $C_{26}H_{36}O_8$, in all probability being a lactone or anhydride of complex structure.

J. H. Roseason.

LAMBERT (A.). “The treatment of typhoid fever with typhoid thymus extract.”—*New York Med. Jour.*, April 27, 1895.

IN October, 1893, Fraenkel reported fifty-seven cases of typhoid fever treated by deep subcutaneous injection of thymus bouillon, in which the typhoid bacillus had been grown and then killed. At the same time Rumpf reported thirty cases treated by the dead cultures of bacillus pyocyaneus grown and prepared in the same manner. These authors stated that a slight rise of temperature occurred in 24 hours, with or without a chill, and on the third day there was a decided fall of temperature not to be accounted for by the usual course of the disease. The general condition was also much improved, and they thought the treatment very valuable.

☛ Struck by the results reported by Fraenkel and Rumpf, Dr. Lambert decided to give the method a trial, using only typhoid cultures.

He describes the method of preparation of the thymus bouillon, obtained from the thymus glands of calves. This bouillon was inoculated from a broth-culture of a typhoid bacillus from the spleen of a patient dead of typhoid fever. These were allowed to grow for seventy-two hours, then sterilised at 62°—63°C., and tested on agar plates to ascertain that the sterilisation was complete.

Dr. Lambert treated 28 cases; of these fifteen showed more or less improvement, which the author believes he can fairly attribute to the treatment. Twelve did not improve, and one death occurred. As a rule, after the third injection the temperature curve showed a lower range, followed after the fifth injection by a decided fall of several degrees, even to normal in the next 24 hours. Sometimes no abrupt fall took place, the fever disappearing by a long lysis.

The pulse showed a decided improvement in frequency, force, and tension, and the general condition of the patient was greatly improved, the classical features of the third week of typhoid being entirely absent. The patients lost their apathy and became bright, sleep was more natural, delirium ceased and diarrhoea stopped. Marked hunger was experienced in several cases after the fall of temperature. In the twelve cases showing no improvement the injections were begun about five days later on the average. In no case was any harmful effect observed due to the injections.

The author then refers to the recently published experiences of Von Jaksch, Kraus, and Buswell. In summing up he states that though brilliant results were not obtained, he believes benefit was derived in more than half the cases, the severity and duration of the disease being modified.

LIÉGOIS. "On the abuse of ergot in hæmorrhages,"—*Journal des Praticiens*, June 22, 1895.

THE author makes a vigorous attack on the routine treatment of hæmorrhage by ergot. He believes that many French and English physicians now recognise that it is of no benefit in the hæmoptysis of pulmonary tuberculosis, ipecacuanha or tartar emetic being preferable, or large doses of thebaine or morphine, or purgatives, large doses of digitalis, quinine, or antipyrine. When by these means the hæmorrhage becomes less troublesome, terebene, turpentine, quinine, or digitalis continued for some days are more efficient than ergot. At any rate, no one would run the risk of ordering ergot for hæmoptysis in a pregnant woman suffering from tuberculosis, or at the menstrual period; opium is then the best remedy.

Ergot should also be avoided in hæmoptysis arising from emboli, whether of cardiac origin or otherwise. In some cases digitalis may be of use; in others, with arterio-sclerosis, etc., hamamelis, hydrastis, cannabis indica, tannin, or gallic acid, or iodoform may be used.

Subcutaneous injections of ergotine close by the nose have been given up in epistaxis, and intra-nasal insufflation of powdered ergot or tampons soaked in a solution of ergotine are no longer used, tampons soaked in turpentine or in a solution of antipyrine or cocaine being employed instead.

Iron is serviceable in epistaxis due to anæmia, scurvy, or purpura; ipecacuanha and then quinine may be used in the epistaxis of phthisical subjects; quinine is all-powerful in the epistaxis of malaria, and the same drug is useful in the epistaxis of puberty, and in that of Bright's disease. Epistaxis due to cirrhosis of the liver, or to gout, is not benefited by ergot. In spite of the stimulating action of ergot on the muscular fibres of the bladder, it is no longer recommended in vesical hæmaturia. Ergot has been given up in hæmophilia. Oculists who have used ergot in retinal hæmorrhages have only obtained beneficial results in diabetics because the drug restrains the production of sugar.

The preparations of ergot topically applied arrest hæmorrhage in external wounds, as they stop epistaxis. Ergotine by the mouth is preferable to injection. In hæmatemesis or intestinal hæmorrhage it may be useful; gallic acid or turpentine may be given along with it.

In hæmorrhage from piles, hot douches through an anal speculum are better than injections of ergotine at the border of the anus.

The author speaks very highly of hydrastin in menorrhagia associated with various conditions, but acknowledges that ergot may be useful in menorrhagia due to uterine fibroids.

He also states that ergot is always effectual in the hæmorrhage after labour due to inertia of the uterus.

GUERMONTREZ. "Treatment of local tuberculosis by pure iodine."—*Gaz. des Hôpitaux*, June 25, 1895.

THE caustic action of iodine is limited and prolonged when the metalloid is introduced in the powdered form into a tubercular focus, and it is still more prolonged when the sublimed crystals are put in, even to completely fill the cavity.

Iodine seems to have an elective action on tuberculous tissues. It acts deeply, and is painless when applied to tubercular nodules, but it is painful and merely superficial in its action when applied to healthy tissue. The eschar formed by pure iodine in a tubercular focus is thrown off spontaneously, four to eight days after the introduction of

the caustic. This eschar has a cylindroid form, is of firm consistence, its centre is formed of excess of iodine, its surface is covered with a little whitish viscous mucin-like liquid, which renders its elimination easy, rapid, and painless. When the eschar is thrown off the surface must be closely examined. The surface is red, firm, and not very sensitive to the touch when the tuberculous elements are no longer present. In the other case, the exposed surface is grey, soft, and more or less sensitive to pressure; this is then an indication to make a fresh application without delay. Eight or ten successive applications usually suffice for cure, provided the cavity is carefully packed to the bottom.

Applications of iodine in this manner to tubercular foci do not seem to occasion any manifestations of iodism. They may be used in young children as well as in adults, and also in syphilitics. They may be continued till complete cure results in tubercular deposits or ulcers on the limbs, in tubercular orchitis, tubercular osteitis, and especially in cases of adenitis.

It is advisable not to wait for spontaneous ulceration, but to open with a bistoury or with the thermo-cautery, and then to apply the iodine directly to the tubercular material.

Francis J. H. Coutts.

"The internal therapeutics of psoriasis and some other diseases of the skin."—*British Journal of Dermatology*, July, 1895.

DR. H. RADCLIFFE-CROCKER read a paper before the Dermatological Society, on May 30, 1895, in which he states his belief that undoubtedly, in some cases, arsenic is not only useless but injurious, that it fails entirely as a prophylactic, and that usually local applications are preferable to its use.

He considers the thyroid treatment has a limited sphere of usefulness, but that it does not give more permanent results than other methods. Thyroid extract is unsuitable for elderly patients with weak hearts, on account of its depressing effects. He calls attention to the use of salicin, salicylates and their allies and derivatives, which had in his hands yielded striking and conclusive results.

In many cases no local treatment was given, the eruption disappearing without it. In only one case did the salicylate seem to aggravate the disease, this occurring after the dose was increased to 25 grains. In erythema multiforme considerable benefit seemed to follow the use of salicylates, and one case of lupus erythematosus showed striking improvement under similar treatment.

"Creasote as a specific in tuberculosis when used in large doses."—*New York Medical Journal*, June 1, 1895.

DR. JOHN R. CONWAY has used creasote in nearly four hundred cases of varied forms of tubercular affection with very satisfactory results. He prescribes the drug in capsules mixed with cod-liver oil in the proportion of one to two. He gives the drug immediately after eating, and never on an empty stomach, taking care to use an absolutely pure drug. He begins with 2-minim doses after each meal, and gradually

increases the dose very carefully till a 20-minim dose has been reached. He has used this dose for four or five months at a time without any unpleasant symptoms to the patient.

"A report on salophen."—*New York Medical Journal*, May 25, 1895.

DR. B. H. WATERS gives a report of 25 cases of rheumatism treated with salophen, sodium salicylate, and *Ol. Gaultheria*, and concludes that improvement was more rapid with salophen than with the other drugs, that complications were less serious, that the average length of treatment was reduced, and that in no case were gastric, renal, or constitutional disturbances observed, whilst the drug was easy of administration, and not unpleasant to the taste. He gives 120 grains during the twenty-four hours at first, and reduces the daily amount afterwards.

"Psoriasis treated with oil of copaiba."—*Therapeutic Gazette*, June 15, 1895.

DR. J. ABBOT CANTRELL states that he has attained remarkably good results from the use of copaiba in psoriasis, and quotes two cases showing its action. He gives 5 minims of the oil in capsules three times a day, and recommends the patient to persist with the treatment for at least three months.

"The treatment of phthisis."—*Journal des Praticiens*, July 27, 1895.

MARAGLIANO has suggested uniting in one formula the principal remedies he considers useful in phthisis. This formula would have the advantage of not provoking anorexia which is so serious a matter in tubercular patients. The formula is as follows:—

Phosphate of calcium...	} of each 4grs.
Menthol	
Bicarbonate of sodium 3grs.	
Powder of nux vomica	} of each 2grs.
Lactate of iron	

for one powder. Four of these powders in the twenty-four hours to be taken with food.

"Antisepsis of the nasal fosse."—*Journal des Praticiens*, July 13, 1895.

THIS antisepsis is very difficult to attain. MM. Lermoyez and Helme prefer a solution of phenosalyl for washing out the nose, using along with it some sodium chloride to prevent irritation of the nasal mucous membrane:—

Phenosalyl	1 part by weight.
Sodium chloride.....	6 " "
Boiled water	1000 " "

"Analgesic mixture."—*Journal des Praticiens*, July 13, 1895.

IN migraines, facial neuralgia, and sciatica, Sabbatain advises the use of a liniment made as follows:—

Menthol	} of each 1 part.
Guaiacol	
Absolute alcohol	18 "

About a drachm to be used on each occasion, rubbing it in lightly, especially over the painful points. Afterwards cover the part with cotton wool. The liniment should not be used more than twice or three times in a day.

"Analgesic and antiseptic gargle."—*Journal des Praticiens*, July 13, 1895.

SABBATAIN uses the following mixture as a gargle in stomatitis and ulcers of the throat, and also as a liquid for lavage in some forms of dyspepsia.

Menthol	1 part by weight.
Alcohol	16 parts ,,
Water	984 parts ,,

The slight stimulating action of the menthol on the muscular coats of the stomach is particularly useful in cases of great dilatation.

"A prescription for phthisis."—*Quarterly Therap. Review*, July, 1895.

DR. T. J. MAYS ("Phila. Polyclinic," 1895, IV., p. 32) recommends the following prescription for phthisical patients:—

Phenacetin	40 grains.
Strychnine sulph.	1 grain.
Ammon. chloride	60 grains.
Quinin. sulph.	32 ,,
Powd. capsicum.....	10 ,,
Powd. digitalis	6
Iron sulphate	20 ,,
Atropine sulphate	$\frac{1}{10}$ grain.
Dispense in 32 capsules. One four times a day.	

Diseases of Children.

UNDER THE CHARGE OF HENRY ASHBY, M.D., F.R.C.P.

PFEIFFER (EMIL). "Ein Hundert Analyses von ausgebildeter menschlicher Milch aus allen Monaten der Stillen nebst zwei Analyses von Colostrum."—*Verhandlung der Elften Versammlung der Gesellschaft für Kinderheilkunde in der Abtheilung für Kinderheilkunde der 66 Versammlung Gesellschaft Deutscher Naturforscher und Ärzte in Wien*, September, 1894.

GÄRTNER (GUSTAV). "Ueber die Herstellung der Fettmilch."—*Ibid.*

ESCHERICH (THEODORE). "Die Gärtnersche Fettmilch, eine neue Methode der Säuglingsnahrung."—*Ibid.*

In the above paper Pfeiffer, of Wiesbaden, gives the result of his analyses of human milk, which are probably the most comprehensive and complete analyses of human milk ever made. The analyses include those made of the milk of women during the whole period of lactation, extending to the end of the twelfth month. One hundred complete analyses were made, and besides these, 60 incomplete ones, including only the proteids and the fat. Two analyses were made of "colostrum" on the first and second day respectively.

The average of his 160 analyses are here given, and I have placed below them the results of the analyses of three other recent experimenters, Hoffmann (quoted by Pfeiffer), Leeds (analyses of the milk of 68 women at different months of lactation—"Starr's Textbook of Diseases of Children"), and the average of 12 analyses of Dr. Luff's (quoted by Cheadle in his "Artificial Feeding and Food Disorders of Infants").

WOMAN'S MILK.						
	Solids.		Proteids.		Fat.	
Pfeiffer	11.778	...	1.944	...	8.107	...
Hoffmann	12.340	...	1.080	...	4.070	...
Leeds	13.268	...	1.995	...	4.131	...
Luff.....	11.490	...	2.350	...	2.410	...
					6.308	...
					7.080	...
					6.936	...
					6.390	...
						Salts.
						1.02
						.210
						.201
						.340
COLOSTRUM (FIRST DAY).						
Pfeiffer	15.7	...	9.756	...	2.594	...
					2.942	...
						.408

Pfeiffer's analyses show that the average milk of the first month of lactation contains a higher percentage of proteids than the milk of the later months, and also a somewhat lower average of fat and sugar; this is due to the milk of the first month more nearly approaching in composition to colostrum than the milk of the later months.

The sugar did not appear to vary much either in the different individuals nor in the different months of lactation.

The percentage of fat was the most inconstant. While averaging about 3 per cent, it was as low as 1.2 per cent, and as high as 9 per cent, varying strangely even in the same individual at different times.

The amount of salts present varied with the amount of proteids present.

The colostrum, it will be noticed, differs from the average milk in the high per centage of the proteids and the low per centage of fat.

Frankland attempted to "humanise" cows' milk, by mixing equal quantities of milk and whey and adding cream and sugar. His method has been very generally adopted, when "humanised" milk is prepared in the household. Others, among whom may be mentioned Biedert, Meigs, and Rotch, have devised various "cream mixtures," in order to attain the same end. Gärtner has utilised the cream separator, to achieve the same result, in a more perfect manner and on a larger scale than it is possible to do in a household. His "Fettmilch" corresponds to what is often called in this country "humanised" milk.

He uses for the purpose a cream separator, which is known by the name of Pfannhauser's Balancecentrifuge, but other separators would apparently answer for the purpose. His method is the following:—Fifty litres of good cows' milk are mixed with fifty litres of water, heated to a temperature of 90 or 100° F., and placed in the cistern of the apparatus.

The separator is set to work and made to revolve at such a rate that the machine delivers the two outgoing streams equal in amount, that is, fifty litres are delivered from one tube, which is connected with the centre of the revolving funnel, and fifty are delivered by the tube connected with the eccentric part of the funnel. The former (the "Fettmilch") contains nearly all the fat in the milk, half the proteids, sugar, and salts; the other (the "magermilch," or "separated milk"), contains a trace of fat (0.1 to 0.2 per cent), and the other half of the proteids, sugar, and salts, as well as any dirt or grit in the milk.

The composition of the "Fettmilch" compares thus :—

	Proteids.	Fat.	Sugar.
Cow's milk diluted, half water.....	1.76	1.81	2.4
"Fettmilch"	1.76	3.00	2.4
Woman's milk.....	1.94	3.10	6.3

It will be seen from these analyses that it will only be necessary to add 4 per cent of milk sugar to the "Fettmilch" in order to make it very closely correspond with the percentage composition of woman's milk. This will be equivalent in round numbers to adding 350 grains of milk sugar to every pint of "Fettmilch."

Another useful office performed by the separator in preparing infant's food is that all the sand, grit, dirt, dried excrement, etc., present in the milk, being heavier than the fat, flies during the revolutions away from the centre, and is removed from the machine with the separated milk.

Directly the "Fettmilch" is prepared by the separator, Escherich recommends it to be sterilised in one of Timpe's or Soxhlet's sterilisers.

His experience of the food in the Children's Hospital at Graz has been very favourable.

Henry Ashby.

Pathology and Bacteriology.

UNDER THE CHARGE OF A. SHERIDAN DELÉPINE, M.B., B.Sc.

ATTLEE (JOHN). "A contribution to the morbid anatomy of the suprarenal capsules.—Abstracts from a Thesis for the M.D. Cantab.

THE physiology and pathology of the suprarenal capsules at the present time are attracting considerable attention, more especially on account of the interesting researches of Oliver and Schäfer, and the contradictory results obtained by Continental workers with regard to ablation of the capsules. While working in Dr. Kanthack's laboratory on the histological and histochemical changes of marantic infants, I noticed peculiar changes in the suprarenal capsules, changes which seemed to be of sufficient importance to be recorded.

Ten wasting infants, not suffering from any named disease, were examined with the following result as to degenerative changes in the suprarenal capsules :—

Case.	Suprarenal Capsules.	Liver.
1.—Five months.	Much fat in cortex ; some in medulla ; very marked in periphery of cortex.	Giant-cell formation. Much fatty infiltration. Cells granular.
2.—Five months.	Much fat. Most at periphery, and in a part of cortex, and some in medulla.	Cells widely separated from each other and fatty. Cirrhosis fairly well marked, mostly near portal veins.
3.—Two months.	Considerable amount of fat in outer part of cortex and middle ; some in medulla.	Cells widely separated ; appear to have lost nuclei. No fat.
4.—Three weeks.	Fat less marked than in 1 and 2 ; most fat in centre and outer third of cortex, but none just below the cortex.	Cells widely separated. Congestion. No fat. Cells degenerated at periphery of lobules.
5.—Fourteen months.	Much fat ; most in outer part of cortex ; none in medulla.	Good deal of fat in outer part of lobules.
6.—Four weeks.	Some fat in cortex ; much in medulla and free blood.	Much congestion. Fatty infiltration well marked.
7.—Four months.	Fair amount of fat in cortex ; slight amount in medulla.	No fat. Nothing abnormal.
8.—Four months.	Fat in periphery of cortex ; medulla free.	Not obtained.
9.—Three weeks.	Much fat throughout cortex ; some in medulla.	No fat. Appears normal.
10.—Two months.	Much fat in cortex ; medulla free.	No fat.

Number of cases examined = 10. Fatty changes in all suprarenal capsules, always in the cortex ; six times in the medulla as well. In five of these the liver appeared normal.

(a) It was noticed that, without exception, in all cases of wasting, the suprarenal capsules contained a considerable amount of fat. This, of course, varied in quantity, but in the majority of cases it was strikingly excessive.

(b) It seemed therefore tempting to assume that fatty changes of the suprarenal capsules are a constant pathological phenomenon in wasting infants.

(c) This assumption seemed all the more reasonable when we remember that in several instances the liver was free from fat, while the suprarenal capsules showed marked changes. In wasting diseases the liver readily becomes fatty, and so do other tissues, and it might therefore be thought that the changes in the capsules were simply a part of a general fatty degeneration or infiltration. The fact, however, that the liver in several cases was apparently healthy, and the suprarenal capsules very fatty, seemed to point to special, if not specific, changes in them.

(d) It is generally assumed that the suprarenal capsules of healthy infants are more or less free from fat, and my limited observations are in accordance with this assumption, as will be shown later.

In the foregoing cases, out of eight livers examined, four contained no fat at all, at least no action could be got with Marchi's reagent. This proves conclusively that fatty changes do not occur in all cases of wasting (that is, if we allow that fat always reacts with osmic acid).

Again, the liver has been stated to be the first organ to be attacked with fatty changes in wasting diseases. This, however, cannot be true according to the results of the preceding investigation, for in only half the cases was there any fatty change at all in the liver, whilst the suprarenal bodies were all more or less fatty. This seems to suggest, as already mentioned, that the suprarenal capsules are among the first organs to be attacked by degenerative changes.

Comparing 13 still-born children with those described above, we find that in the main they differ very greatly from the cases of marasmus. For, in the latter, we found that in 10 cases *all* showed extreme fatty changes, while here, of 13, only *one* showed fat to a degree comparable to the marantic cases.

If we are right in considering still-born children to be normal, then it seems that the general belief, that normal suprarenal capsules of young individuals are free from fat, is not based upon fact. Undoubtedly, not all still-born children are normal; in many, as we well know, death is due to intra-uterine disease, and that is a point which we must remember. For this may explain why in some capsules a certain amount of fat did exist—in one case a considerable quantity—and it will be shown later that in certain diseases, even in the young, the suprarenal capsules readily become fatty. These observations on still-born children give at least some support to the opinion expressed above, that in wasting severe changes occur in the suprarenal capsules.

The following is a summary of the observations on still-born children: Of 13 still-born children examined, 4 suprarenal capsules showed no fat at all; 1 much fat in the cortex; 4 a slight amount of fat in the cortex; 1 fat in the medulla alone; 2 slight amount of fat both in medulla and cortex. Only once much fat was found in the liver.

Fatty changes of the suprarenal capsules are also found in children who have died from various diseases oftener than is generally assumed. But these fatty changes are never so well marked as in marasmus, and where wasting is a complication, such changes at once become pronounced.

Ten children suffering from various diseases were examined :—

No fat or at least very little in suprarenal bodies. 5 cases.	1. Tubercular meningitis.
	2. Diphtheria.
	3. Cerebellar tumour.
	4. Capillary bronchitis.
	5. Intestinal obstruction.
Much fat. 5 cases.	1. Broncho pneumonia.
	2. Cerebral tumour with wasting.
	3. Diphtheria.
	4. Jaundice (severe).
	5. Nephritis and pneumonia.

On analysing the last five cases, we find that in one case there was considerable wasting and in the others a condition of intoxication or toxæmia. We shall see later that toxic conditions seem to exert a marked influence on the state of the liver and suprarenal capsules.

From observations on adults little is gathered, because in almost every case marked fatty changes are found, and it would require a research continued over a long period before anything like a confident conclusion could be offered. I shall, therefore, abstain from further comment at the present time, but merely give a summary of my observations :—

ADULTS DYING OF VARIOUS DISEASES.

Case.	Suprarenal Capsules.	Liver.
1.—Aged 40. Septic meningitis following fractured base.	A little fatty in periphery of cortex.	Not obtained.
2.—Aged 30. Septic pneumonia following fractured lower jaw.	Both cortex and medulla showed marked fatty changes.	Not obtained.
3.—Aged 34. Abscess in broad ligament.	Slight fatty changes in cortex. Medulla free.	Much fat.
4.—Aged 19. Tubercular disease of pons.	A good deal of fat in cortex ; some in medulla.	Little fat.

ADULTS DYING OF VARIOUS DISEASES.

Case.	Suprarenal Capsules.	Liver.
5.—Aged 44. Cirrhosis of liver with alcoholic neuritis.	Good deal of fat in cortex.	Much fat.
6.—Aged 53. General tuberculo- sis.	Marked tubercular disease. Some fat.	Not obtained.
7.—Aged 63. Cerebral hæmor- rhage.	Much fat in cortex. Some in medulla also.	No fat.
8.—Aged 53. Aortic disease and granular kidneys.	Well marked fatty changes in cortex, and some in medulla.	Some fat.

However suggestive the results so far obtained may be, it must be confessed that the "negative" outweighs the "positive." Without spending months and years on microscopic observations, it seemed futile to hope for a solution of the problem which arose before my mind.

Perhaps there is a shorter road, viz., observations and experiments on animals. Dr. Kanthack or others kindly did these for me.

As will be seen, this road is also beset with many difficulties, and even after a fairly extensive series of observations, the solution of the problem is still remote. Further experiments may throw more light on the question.

My observations were made on rabbits, cats, and kittens,

From these observations it would seem that—

(1) Starving produces marked fatty changes in the suprarenal capsules of young rabbits, though the liver at the same time may be unaffected.

(2) The capsules of adult rabbits either starving or suppurating to a degree which implies marked cachexia, became intensely fatty. Unfortunately it would seem that the capsules of normal adult rabbits are occasionally also very fatty.

(3) In acute and chronic poisoning the suprarenal capsules became out of all proportion fatty, so that at times it was almost impossible to cut good sections of them.

I am therefore almost inclined to accept the little positive support to be derived from these observations, notwithstanding that, as will be seen, those on cats and kittens are extremely perplexing.

OBSERVATIONS ON RABBITS.

Case.	Suprarenal Capsules.	Liver.
1.—Healthy adult rabbit.	No fat.	Not examined.
2.—Adult rabbit, starved for 48 hours.	Much fat in cortex. None in medulla.	Not examined.
3.—Adult rabbit, wasted and thin.	Much fat in cortex. None in medulla.	Not examined.
4.—Young rabbit, healthy ; fed up for three days.	No fat at all, but large vacuoles in cortex (high power).	Not examined.
5.—Young rabbit, starved for 96 hours.	Very great fatty degeneration.	Very little fatty degeneration, scattered about.
6.—Adult rabbit, healthy.	Much fatty degeneration of cortex. Medulla none.	Not examined.
7.—Adult rabbit, suppurating.	Much fat of cortex—not in extreme outer part. Medulla none.	Not examined.
8.—Adult rabbit, suppurating.	Absolutely no fat. Medulla none.	Not examined.
9.—Young healthy rabbit.	No fat.	Not examined.
10.—Young rabbit, starved for 96 hours.	Whole cortex converted into fat.	Not examined.
11.—Adult rabbit, suppurating for one month.	Much fat in cortex—most at the outer part. None in medulla.	Not examined.
12.—Adult rabbit, acute cobra poisoning.	Whole cortex very fatty, except at <i>outer</i> margin of cortex.	No fat.
13.—Adult rabbit, copper tartrate.	Extreme fatty changes—almost pure fat.	Typical fatty infiltration ; fatty changes also in kidneys.
14.—Adult rabbit, copper tartrate.	Extreme fatty changes—almost pure fat.	Less marked. Less marked in the kidneys.

On examining eight healthy kittens, in every case there was much fat in their suprarenal capsules, which, however, was exclusively confined to the cortex, and in five of these cases there was a considerable amount of fat in the livers, while in the remaining three the reaction was absent. Again, in three starving kittens, all the suprarenal capsules contained much fat, the amount taken as a whole being appreciably the same as in the healthy animals. In the livers, two out of the three had no fat, whereas the other was very markedly so.

But if we consider the conditions as they are found to exist in various animals, it becomes evident that there are great differences between various groups or classes of animals, and that repeated observations are wanted—comparative studies are necessary.

In cats the suprarenal capsules normally seem to be fatty at any age, while in man and rabbit (in the young) they appear to be free from fat, and acute starvation in these seems to produce rapid fatty changes.

Oliver and Schäfer have recently shown that the extract of the suprarenal capsules of the sheep has a marked tonic effect on the animal organism, raising the blood pressure considerably and increasing the arterial tension.

Degenerative changes of the capsules must affect this function, and certainly in Addison's disease prostration is a prominent feature. Considerations of this nature induced me at Dr. Kanthack's suggestion to take up this research. The result is small at present; but nevertheless I hope it may contribute to clear some of the ground, and direct some slight attention to important chemical changes in the suprarenal capsule organs, of whose nature and development and function we are still ignorant.

Oliver and Schäfer found the "active principle" in the medulla, while it was absent in the cortex of the suprarenal bodies. Now in most of my cases of infantile marasmus the degenerative changes were most marked in the cortex. It might therefore be thought that these changes are of no importance. This, however, seems a premature conclusion, for (a) we have no evidence that the substance extracted by Oliver and Schäfer is the active principle, though it is undoubtedly an active principle with certain physiological actions; (b) degenerative changes in the cortex must mean general abnormal changes in the suprarenal capsules, i.e., nutritive changes which may affect the anabolic or katabolic processes of the capsules, so that although the medulla anatomically may be but little altered, yet its "secretion" may have been considerably affected or impaired; (c) frequently the medulla also was in a state of degeneration. Anyhow it is of importance, so long as we are comparatively ignorant of the part played by the suprarenal capsule, to study minutely all the changes which the microscope may reveal to us.

Abstracted by the Author.

NOTKINE (J. A.): Kiew. "Pathogenie de la cachexia strumipriva; la thyroproteida."—*La Semaine Médicale*, April 3, 1895.

TOTAL thyroidectomy leads to a fatal result in all animals. Myxœdema is the effect of a poisoning by one or more toxic products which accumulate in the organism of the animal thyroidectomised, and ought to be

regarded as a true auto-infection. The thyroid secretes a substance capable of decomposing or neutralising these toxic products of intra-organic exchanges.

The toxic products have not yet been isolated, nor the antidotal secretion of the thyroid.

Dr. Notkine from his experiments considers that the toxic substance which is the cause of myxœdema ought to be found in the thyroid itself, and, in fact, he has discovered in several animals an albuminoid substance, relatively abundant in cows, sheep, and pigs, but in smaller quantities in dogs, which constitutes the greater part of the colloid matter in the thyroid, and which he terms "thyroproteide."

Experiments were made on dogs, rabbits, and guinea-pigs, some of which were healthy, and some of which had been thyroidectomised previously at varying intervals. The experiments are divided into three classes, according to the dose of "thyroproteide" administered. Class I.: Dose, 2 to 4 grains of thyroproteid per kilogram of animal was injected. Class II.: Dose, $\frac{1}{2}$ to 1 grain per kilogram. Class III.: Smaller doses; experiments not yet completed. Pure "thyroproteide," which is a definite chemical substance, was used in all the experiments, dissolved in a solution '6 to '7 per cent of sodium chloride. The solution, at a temperature of 35° to 38° C., was injected into the circulation directly, or in the later experiments into the peritoneal cavity.

Conclusions.—The substance "thyroproteide" which has been obtained in a pure state from the thyroid of the sheep, pig, and dog is an albuminoid, but differs from all other known albuminoids. The chemically pure thyroproteid is toxic for animals, and produces in them a condition similar to myxœdema, except in large doses, when it kills the animals in from 1—6 days. The substance decomposes very slowly in the organism, and has a cumulative effect when repeated.

For an animal deprived of its thyroid, or its greater part, thyroproteid is toxic, even in doses which a healthy animal receives with impunity. If a sufficient interval after a partial thyroidectomy has elapsed, the remaining thyroid hypertrophies and the animal reacts to thyroproteid like a healthy one.

The action of thyroproteid is at first excitant and then paralysing; it affects probably the central nervous system. Under its influence the cardiac contractions appear to be enfeebled and slowed, in no case were they accelerated. If the animal lives long enough the general nutrition suffers and emaciation results. At autopsies, the liver is found congested, the thyroid always anæmic and very œdematous. The ingestion of thyroid or its extract exercises an action which in many points is the counterpart of the effect produced by thyroproteid. On the other hand, clinical experience has shown that thyroid feeding causes an involution.

of the diffuse colloid goitres, and that in such a way that the colloid substance contained in the alveoli of the gland disappears as if it was decomposed and absorbed in the same alveoli. Dr. Notkine thinks that this colloid mass represents, so to speak, the anatomical equivalent of thyroproteid, and that the latter is not a product of secretion of the gland, but a waste material derived from intra-organic changes. Thyroproteid, therefore, in all probability, is the poison which, being accumulated in the organism after thyroidectomy, causes myxœdema, and which normally is destroyed or neutralised by the true secretion of the thyroid gland, which contains a special ferment.

The physiological rôle of the thyroid then consists in removing the thyroproteid from the blood, storing it in the alveoli, and there neutralising it, and then, after rendering it innocuous, returning it to the circulation to undergo further change.

Grave's disease, which very probably is the result of an intoxication by the thyroid enzyme produced in excess, appears to be favourably influenced by the administration of thyroproteid in small doses.

J. Gray Clegg.

FRANKLAND (E.). "Abstract of remarks relating to the influence of filtration, storage, temperature, sunshine, rainfall, etc., on the number of bacteria in water."—Annual Report on Metropolitan Water Supply, 1894.

BELIEVING with Koch and with American observers at Lawrence, Mass., that efficient sand filtration is practically a perfect safeguard against the introduction of cholera and typhoid bacilli into drinking water, Professor Frankland attaches the highest hygienic importance to the bacterioscopic examination of river-derived drinking waters, as the only trustworthy method by which their efficient filtration and bacterial purity can be ascertained. To facilitate such examination in the Metropolis he advocates the establishment of small bacteriological laboratories at the various river water intakes. It is to be hoped that the time is not far distant when such provision will form part of the equipment of all filtering works, so that (as is now the case in the Metropolis) the engineer in charge may at once be informed when any filter is working unsatisfactorily, for, to quote Professor Koch, "It is the business of those in charge of the works to take care that the filtered water always satisfies bacteriological requirements."

The results of bacterioscopic examination of the unfiltered river waters used by the Metropolitan companies in 1894, once more demonstrate (1) the immense destruction of bacteria which is effected by storage in subsidence reservoirs, and (2) that the bacterial quality of these waters may widely differ from their chemical qualities. Thus, the

water pumped from the natural gravel beds near the Thames is nearly identical chemically with the Thames water itself, but the bacterial purity of the gravel water far exceeds that of the Thames water, and, indeed, not infrequently that of the filtered Thames water sent into London. Again, although the water of the Lea was found during the year to be chemically purer than the Thames, and also in its higher as compared with its lower reaches, yet the determinations of 1894 have demonstrated that bacterially the higher portion of the Lea is enormously inferior to the lower portion, and also to the Thames at Hampton. Dr. Frankland specially draws the attention of the Lea Conservancy Board to this unexpected condition, and one naturally recalls the strictures of the late Royal Commission on the large heaps of gas-lime, manure, and town refuse, which, as far, at any rate, as Hertford, "are placed on the edges of the banks (of the Lea), and within a few feet of the stream itself," and which, obviously, in times of rain and flood became a serious source of pollution. No part of this report will be read with greater interest than the observations recorded on the causes of the great variations in the amount of microbial life in river waters during the course of the year. Changes of temperature or exposure to varied amounts of sunshine have hitherto been regarded as responsible for these variations, the Royal Commissioners stating in their recent report that bacterial life is injuriously affected by "even such a tempered amount of light as is present under ordinary conditions in Thames water." Professor Frankland now, however, demonstrates that the amount of rainfall, or, in other words, the volume of water flowing in the river is the chief cause of these variations. In a series of most interesting tables and diagrams he brings the number of microbes in raw Thames water into contrast with each of these alleged causes, and his conclusion is as follows:—

"That the number of microbes in Thames water is determined mainly by the rate of the flow of the river, or, in other words, by the rainfall, and but slightly, if at all, by either the presence or absence of sunshine or a high or low temperature. With regard to the effect of sunshine, the interesting researches of Dr. Marshall Ward leave no doubt that this agent is a powerful germicide, but it is probable that the germicidal effect is greatly diminished if not entirely prevented when the solar rays have to pass through a comparatively thin stratum of water before they reach the living organisms. If this be so, however, it can be no matter of surprise that the effect of sunshine upon bacterial life in the great mass of Thames water should be nearly, if not quite imperceptible."

In regard to filtered water, if 100 microbes or their spores per cub. cent. be taken as the permissible limit of bacterial life, the effluents of

the Chelsea, West Middlesex, the Lambeth, and the New River Companies were almost uniformly of great bacterial purity. Never once throughout the entire year did the Chelsea filtered water exceed the above limit. The West Middlesex and the Lambeth both transgressed once (in January) and the New River Company twice (January and June). Ten samples of the Grand Junction Company's effluent (four from the Kew and six from Hampton filters) exceeded the limit, the worst results (464 and 278 per cub. cent.) being in January and June. Four samples of the Southport and Vauxhall Company's effluents taken respectively in January, February, July, and December were also unsatisfactory. The very small storage possessed by both the two last-named companies is considered mainly responsible for these results. The East London Company's filters worked very irregularly up to (but not after) the end of July, and up to that time (except during May) there was always at least, one unsatisfactory sample. Most of the foregoing abnormal results occurred when the raw river water was bacterially very impure. The closing pages of the report are devoted to a *resumé* of the results hitherto obtained at the Lawrence (Mass.) Experimental Filtration Station, which are briefly: (1) That within the limits of 300,000 gallons to 3,000,000 gallons per acre per day, variations in the rate of filtration have practically no effect on the purity of the effluent, and that filters may be satisfactorily operated even at the rate of 5,000,000 gallons per acre per day, provided that a uniform rate is maintained; (2) that the finer the size of the sandgrains, between the limits of 0.2 mm. and 0.9 mm. diameter, the higher the percentage of bacteria removed; (3) that with any moderate rate of filtration, depth of sand with the limits of 1 ft. and 5 ft. exerts but little influence upon the percentage of bacteria removed; (4) that scraping the surface of a sandfilter does not interfere with bacterial efficiency provided there is no mechanical disturbance of the main body of the sand.

It is well known that Professor Koch has pointed out certain difficulties attending efficient filtration during times of frost, which he ascribes to (1) freezing of the superficial sandlayer, causing at first total arrest of filtration, and later on excessively rapid filtration through the portions of the surface which are the first to thaw and become permeable; and (2) the impossibility of cleansing the sand surface of open filtering basins which have become thickly covered over with ice. Professor Frankland, however, refers to, and reserves for future report, some entirely novel phenomena affecting filtration, which the recent severe weather in England has brought to light, and the publication of his observations will be awaited with much interest.

Charles Porter.

Reviews.

"Dr. William Smellie and his Contemporaries." By JOHN GLAISTER, M.D. Glasgow: James Maclehose and Sons. 1894.

THE author has succeeded in producing a very readable and eminently interesting biography of Smellie. It is also a good deal more than the biography of an individual. By tracing Smellie's origin and early history, describing the methods of practice which he found in Scotland, indicating the causes of his discontent with these, following his ambitious career in Paris and in London, and giving some account of the friends who aided him and the opponents who retarded his progress and limited his influence, Dr. Glaister has worked out an interesting history of midwifery in the last century, and endowed it with all the attraction and charm inseparable from the contemplation of the career of a prominent individual who made a mark on the professional life of his time, and considerably influenced for good or ill the opinions and practice of several generations of medical men in all parts of the world.

The work is certainly no perfunctory or fancy sketch. There is evidence in every chapter of laborious literary research, and between the lines one can read of the sacrifice of much material for the sake of conciseness and symmetry. It would probably have improved the book if the author had sacrificed a good deal more, especially in some of the later chapters.

Smellie is not by any means depicted as a 'medical hero or man of colossal genius. He is represented as a man of ability, energy, and ambition; he is untiring in his observation of the symptoms of disease, and, later in his career, of the phenomena of parturition, and he takes precise and laborious notes. He is endowed with a large amount of confidence in himself, and that, combined with sufficient imagination to see "in the green the mouldered tree," leads him to seek professional instruction and inspiration in the Paris hospitals of Louis XV., and afterwards to settle, even "in a humble way," in London, as apothecary and man-midwife. The author is a too fair and candid historian to conceal from the reader the weaker sides of the character of his subject. He shows that if Smellie had a more or less admirable faculty of acquiring knowledge and pecuniary remuneration, it was exercised largely in a mechanical fashion, and on a narrow and restricted scale. There was a certain sordidness about the career which cannot be concealed, a want of generosity in the man's references to contem-

poraries who deserved his respect and gratitude, a plenitude of humility and a want of reticence and of dignity, and even of evidence of self-respect, in his attitude towards ill-tongued opponents and detractors. When a successful man he took no part in any enterprise outside his own immediate interests and personal concerns; he exhibited no public spirit; he left no mark during his lifetime on the community in whose midst his professional life was passed; when he thought a sufficient competence achieved, he quietly vanished from the scene of his professional labour, as if his relations to it had been purely commercial, and became a "bonnet laird" in his native valley: and after his death it was found that he had bequeathed his wordly goods with the most finical and bewildering details as to their subdivision, to a numerous clan of humble friends and relations. There is exhibited in all this a blend of eminently respectable principles and some questionable qualities, but the resultant is not an object for hero worship.

Among the more important subjects discussed is Smellie's position as an inventor, more especially with reference to the improvement of the obstetric forceps. Here we think the author shows some partiality, naturally enough, perhaps, in assigning undue credit to the subject of his memoir. Not that he is unfair and partisan. He gives Smellie's own words, and does not press his claim; but perhaps he does not show sufficient appreciation of the claims of Pugh and Levret. He leaves it to others less weighted by knowledge of the subject and by reasoning faculties to be enthusiastic partisans of the Scotsman. Dr. Glaister says, "Smellie must also be credited with the invention of a *longer curved* instrument, but whether he is entitled to the claim of priority of invention is a question open for discussion." It cannot be denied that Smellie had a certain talent as a mechanician, and that he invented or adapted various obstetric instruments and apparatus is conceded by all, but as to the long forceps he does not write in the language of an inventor, his words rather carry the stamp of a certain want of frankness and generosity towards the merits of contemporaries that too often appears in reference to other matters. It was in reference to a case of forceps to the after-coming head in 1752 that he referred to the defects of the short straight instrument and said: "This was the reason which prompted me to contrive a longer kind, the blades of which are curved on one side." Yet, in relating the facts of a similar case *in the following year*, he says of the long forceps: "They were contrived some years ago by myself, as well as other practitioners, on purpose to take a better hold of the head when presenting and high up in the pelvis, but I did not recommend their use in such cases, for fear of doing more harm than good by bruising the parts of the woman when too great force was used." There are two contradictions and an oblique reference merely to "other

practitioners" as co-inventors. Now, as Levret sent Smellie a copy of his book, published in 1747, and for aught we know may have also sent him a specimen pair of his forceps, the reference to his French friend is not fulsome; in fact, its reticence is suspicious. Pugh, of Chelmsford, again had his claims, which Smellie probably knew about. This practitioner had used a long curved midwifery forceps since about 1741, and had it made in London. Pugh appreciated, praised, and used his instrument. Smellie raised objections to the product of own inventive genius as if it were that of a friend, and he was long in using it even in suitable cases. The facts of history, and his own want of paternal interest in the invention, do not support Smellie's claim to the place of honour in taking what had after all become a very obvious step in the evolution of obstetric surgery.

The chapters which give an account of the state of midwifery practice and teaching in London in Smellie's time, and of the chronic controversies which existed between the male and female obstetric practitioners, contain interesting and amusing reading, and often bear a ludicrous resemblance to the polemics of the present time on the same subject. The subject is much the same, the language is as frank and strong, and the methods of controversy of 150 years ago bear much the same qualities as they do at the present time. There are several parties to the combat of opinion and interests, and their relations become sometimes bewildering. The midwives appear to have been in possession of a vastly preponderating amount of the practice, including in their *clientèle* all classes from queens and princesses to the lowest residuum. One aspect of the fight was the struggle of the female practitioners to defend their position and emoluments from the assaults of the "man-midwives," and chief among their weapons were libellous pamphlets and secret misrepresentation and slander. Another phase of the controversy was seen in the alarm of the licensed practitioners in medicine and surgery at the rapid spread of midwifery practice, even of operative obstetrics, among the apothecaries and ignorant "men-midwives," and while demanding State interference for the protection of the public, they denounce in no measured terms the teachers of midwifery, who, if not careless and venal, did not avoid the appearance of evil. On this part of the question our biographer does not suggest any sufficient defence of Smellie's practice as a private teacher of midwifery, and making every allowance for the animus displayed in the attack of Dr. William Douglas, there remains an impression in the mind of the reader of Smellie's biography and autobiography that his practice was undignified and unworthy, even if it was not at times sordid, mean, and dishonest. Among much that was absurdly extravagant and offensive, Douglas brought certain definite charges against Smellie, which should

not have been answered indirectly, or by deputy, even by the most peace-loving of men. One of these charges was that he abused his position as a successful practitioner and teacher of midwifery to lower and degrade the profession by recklessly granting certificates for fees to ignorant and incapable pupils, "Even without any Regard to Consequences, in your Bills you set forth, that you gave an *universal Lecture in Midwifery for Half a Guinea* or divided it into *Four for a Guinea*. Now, sir, suppose that any one that had your universal Lecture, and after that Consequently your Certificate; from which, as a Voucher in his Pocket, the World might believe him qualified . . ." and certain disastrous consequences followed from the pupils' ignorance and confidence in himself ". . . . to whom could a Man of the Profession impute this wickedness? to a mean-spirited Master, greedy of *Half a Guinea* or a *Guinea*, or to a poor *mistaken Pupil*?" Smellie's indirect answer, and the defence by his anonymous pupil, make no reference to this definite accusation of underselling and want of conscientiousness. Douglas again returns to the charge:—

"The Opportunity of learning Midwifery upon easy Terms in *England* being known, very soon began to extend itself into the *Country*; upon this the *Apothecaries* in all Parts, began to think of acquiring a *Midwifery* Knowledge, and their method has been, to write to some friend here in Town, to Know when Dr. *Smellie's* Course would begin, and ordering Matters so, as that they could attend his *Lectures*, have returned in a *Week* or a *Fortnight*, with their *Certificates* of being *Masters of Midwifery*; this *Certificate* being ornamented with a *Frame*, and *glazed*, is hung up in the *Parlour* or *Shop*, to attract the *Eye*, and thereby give Intelligence to every body who shall come there, that the *Proprietor* has taken his *Degree* in that Profession. Thus, to the infinite Disreputation of *Midwifery* and I fear to the Loss of many Lives, has this Method of Teaching afforded these *Practitioners* an opportunity of being called to the most difficult Cases that happen, which they never refuse to attend. The fatal Consequences of which *superficial Education* is, as I am informed, felt in almost every County of *England*." Then follows a bitter and suggestive accusation:—"These Gentlemen likewise cry up the *Doctor* as the greatest *Man* of the Profession, and have contributed to his Popularity." A curious physical feature in the literature of these controversies in the eighteenth or nineteenth century is the tendency to run into capitals and italics.

The author devotes a considerable amount of space to the method and matter employed by Smellie's female opponents. If this work had appeared even in some of the more recent years in which the author has been engaged in his compilation, the reflections of the reader with regard to this type of antagonist might have been expressed in the

words of the poet: "Dead the warrior, dead his glory, dead the cause in which he died." But a sort of melancholy interest again attaches to the controversy by a recent revival; only now the relations of the antagonists are reversed. The grounds on which Smellie was made the chief object of attack are by no means to his discredit. He was subjected to malignant misrepresentation and slander chiefly because he was the most prominent of the teachers of midwifery to *male* pupils; because he introduced and advocated the use of instruments, especially the forceps, in midwifery practice; and, generally speaking, he represented French improvements and progress in the obstetric art. One of the most truculent of these female opponents published a work of several hundred pages, of which a specimen may be given. She entitled it, "A Treatise on the Art of Midwifery, setting forth Various Abuses therein, Especially as to the Practice with Instruments; The Whole serving to put all Rational Inquirers in a fair Way of very safely forming their own Judgement upon the Question; Which it is best to employ In cases of Pregnancy and Lying-In, *A Man-Midwife; or a Midwife*. By Mrs. Elizabeth Nihell, Professed Midwife. London. 1760." It is dedicated "To all Fathers, Mothers, and likely soon to be Either." In the preface she informs us that "in this attempt of mine there is no blamable ostentation," but she adds, "I own, however, there are but too few midwives who are sufficiently mistresses in their profession. In this, they are some of them but too near upon a level with the man-midwives, with this difference, however, in favour of the female practitioners, that they are incapable of doing so much actual mischief as the male-ones, oftenest more ignorant than themselves, but who, with less tenderness and more rashness, go to work with their instruments. . . . In the meantime, does it become a doctor to call us interested, who himself, for three guineas in nine lessons, made you a man-midwife, or a female one." The dreary monotony of the invective is seldom relieved by a gleam of wit or humour. One malicious suggestion, quoted by Dr. Glaister, appears to have escaped the protagonists in quarrels of a later date. Inveighing against everything French, the authoress denounces "that new-fangled word *accoucheur*, which is so rank and bare-faced a gallicism. . . . Let us change it for a Latin one of *Pudendist*."

The chapter in Dr. Glaister's book on "The Condition of Midwifery in London," about the time that Smellie settled there, is full of interest. He gives several quotations from a thoughtful and vigorous pamphlet by one of the reformers of the time, which has, in many ways, a startling resemblance to what is now being said and written. "The writer at the outset notes with surprise that, whilst other departments of surgery have been practised and improved by men, the operations necessary for the safety of women in labour and their children—operations of more

consequence to mankind than all the rest ; operations so often wanted, so difficult many times to perform seem to have been entirely left to a parcel of ignorant women, or to men little better qualified than they, who, upon any extraordinary difficulty (as too many still do), took hooks or knives and carved the children to pieces, and often, also, destroyed the mother." He says that in Paris things are better managed, for there all the "Midwomen" must be examined and approved before they dare begin to practice ; which, he adds, is "an example most worthy of imitation ;" while, on the other hand, in London they permit "every silly woman who takes it into her head, with very little or no instruction, to practise *impune* among his Majesty's subjects, without any the least examination or licence. Why, says he, call midwives 'rude, rough, negligent, ignorant, foolish, novice, obstinate, over-confident, supine, unskilful, conceited, self-sufficient, etc.,' when no effort is made to educate them ?"

To this pamphlet appeared a reply, the title of which conveys a sufficient idea of the controversy. It is a reply to the author of a pamphlet "wherein his trifling and malicious cavils are answered, his interestedness and disingenuity impartially represented, and the Practice of Physick vindicated from his indecent and unjust aspersions."

Nearly twenty years later some progress had been made, and yet even then George Counsel, Surgeon and Practitioner in Midwifery, wrote, in 1752, a work entitled "The London New Art of Midwifery, or the Midwife's Sure Guide," etc., in which he declared that such was the condition of midwifery then that mothers and their offspring were being "daily, if not hourly," destroyed "by ignorant wretches in almost every state of life ; a pack of young boys and old superannuated washerwomen, who are so imprudent and so inhuman as to take upon them to practise even in the most difficult cases that can possibly occur." As a corrective of this, he urgently demanded that the State should interfere "to examine all such as are to be admitted to practise, and take care of the lives of his Majesty's subjects."

These chapters, however interesting, cannot be pleasant reading to those who are now working for improvements in the training of those who are to practise midwifery, whatever their views as to the meaning of progress may be. Comparison of the state of matters one hundred and fifty years ago with the present time, and reflection on the influences at work all the time, should at least suggest the exercise of patience and the assumption of a philosophic calm in contemplation of the relation between efforts and results.

The author's chapters, analysing Smellie's contributions to the science and art of obstetrics, are of the greatest interest from the historic point

of view, and they are characterised by fulness of knowledge, mature consideration, and fair unbiassed judgment in stating conclusions. His review and analysis of the history of Midwifery, for a century ending 1760, is in itself a learned, laborious, and useful chapter in the history of Medicine.

The author has expended a vast amount of effort in literary research so as to identify and give some account of Smellie's friends and acquaintance in London. With regard to such men as Smollett, the task would be easy, but as to many others it is hard to see the value of the labour. To many the chapter on "Scottish Graduates in London" will be of considerable interest, containing, as it does, references, mostly too concise, to many men of mark who were contemporaries of Smellie.

Altogether, Dr. Glaister's book is one of which he may well be proud. It is full of honest, able, and effective work, and will be welcomed as a valuable contribution to the history of Medicine.

"A New Method of Inhalation for the Treatment of Disease of the Lungs." By W. H. SPENCER, M.A., M.D., M.R.C.P. London: The Scientific Press, 1895.

IN this little book Dr. Spencer discusses the usual methods of introducing drugs into the respiratory passages, and points out their various disadvantages and comparative want of success as remedial methods in lung diseases. He then describes a method of using certain volatile oils and other antiseptic substances, so as to impregnate the air of a room with the drug in a state of vapour. Patients suffering from various forms of pulmonary disease, especially phthisis, are placed in the room for a given time or even inhabit it entirely while under treatment. The method described and the special vaporiser designed by the author have already been brought before the profession, and much greater success in treatment is claimed from their use in suitable cases. The publication of the present *brochure* will no doubt induce many practitioners to give a more extended trial to what may prove a valuable means of treatment.

"Surgical Diseases of Children, and their Treatment by Modern Methods." By D'ARCY POWER. London: H. K. Lewis, 1895, (Lewis's Practical Series), pp. 548.

THE chief aim of this volume, as set forth in the preface, is to state the various methods connected with the treatment of the surgical diseases of children, which have proved themselves the most successful in the author's hands. "Only so much pathology has been introduced as is necessary to show why the modern treatment differs from that formerly employed."

From this standpoint Mr. Power has produced a concise, yet comprehensive work, which will prove of great value to those, whether practitioners or senior students, who may wish to have at hand a *resumé* of the modern method of treatment employed in this branch of surgery. Very considerable judgment has been displayed in deciding as to the extent to which principles of general surgery and details of pathology should be inserted in order to illustrate rationally the subject treated of. A desire for conciseness is shown a little too much at parts, particularly in the paragraphs on diagnosis, the brevity of which occasionally detracts from their utility.

Tuberculous affections very justly occupy one-fifth of the book. In the chapter on tubercular arthritis, a useful coloured plate is introduced, showing in sections of the five chief joints the relations of the synovial membranes. A full account of Lannelongue's operation of "sclerogeny" is given, to which Mr. Power states he is giving an extensive trial, but upon which he will, as yet, give no dogmatic opinion. In the treatment of tuberculous conditions, after operation, Mr. Power seems to be scarcely consistent. Thus, in tuberculous abscesses he has discarded the use of iodoform emulsion, and scrapes all the tuberculous material away with a sharp spoon, in order to obtain, if possible, union by first intention. In tuberculous bursæ also, he recommends that the collection, whether suppurating or not, should be scraped out, and the wound sewn up entirely, without the use of a drainage tube, lest failure in healing by first intention should occur, the latter being "of vital importance." Yet, in the case of excision or erosion of joints, his practice, after all visible tuberculous material has been removed, is to "swab out" the cavity with a solution of chloride of zinc (a varying strength of 1 in 10, 1 in 12, and 1 in 15 is advocated in different places). This cauterisation, or, at any rate, devitalisation of the tissues, together with the presence of a drainage tube in the joint, the use of which must often be a necessity to carry off the serous effusion resulting from the caustic, must surely militate against primary union. It is, therefore, not altogether surprising to find that the author's experience is "that secondary operations are required nearly as often after excision of the hip, as after excision of the knee; indeed, it very rarely happens in either joint that a single operation is sufficient to secure the absolute removal of all the diseased tissue."

There is, perhaps, at parts a want of proportion in the space allotted to different subjects, too much being given to the consideration of rare conditions, to the detriment of commoner, and therefore, probably from the reader's point of view, more important ones. For example, tuberculous disease of bursæ occupies half as much space as is given to the whole subject of hip joint disease, and the application of Thomas's hip

splint is dismissed in two lines, which will be unsatisfactory, we imagine, to the practitioner out of reach of instrument makers, who requires full directions for its manufacture and application.

The statement is made that tuberculous disease of the shoulder forms 25 per cent of the total number of joint cases in children; disease of the elbow forming 50 per cent of all cases; hip 37 per cent; knee 30·7 per cent; and ankle 15·75 per cent; the total for these five joints alone being 158·45 per cent! There must be something wrong here.

Exception must also be taken to the following: "An ossifying sarcoma of the lower end of the femur may be mistaken for a case of tuberculous disease (of the knee joint), though infiltration of the glands in the groin will soon render the true nature of the case conspicuous." Consideration for the patient's welfare should not allow a delay in diagnosis until such an undesirable sequence of events has occurred, even if the inguinal glands constantly become affected, which is surely doubtful.

The injuries and diseases of bones are discussed fully, and in a most ble manner. The condition described as syphilitic osteomyelitis might with greater accuracy be termed epiphysitis.

Amongst the most valuable sections of the book may be mentioned those dealing with intracranial disease, and operations on the skull and brain; and diseases of the respiratory tract, both nasal and laryngeal, including tracheotomy and intubation; but the chapters on regional affections are all good and contain much careful work. Orthopædic surgery, however, is scarcely mentioned.

Of the sixty illustrations, those which are original are the best. A most useful appendix of references to recent writings on the more important subjects is added.

Whilst the work, as a whole, is thoroughly reliable, and is written in a pleasant and easily readable style, some sentences show evidence of haste, and a certain number of small errors have been allowed to creep in. Thus, on page 230, a child is said to have been given half-drachm doses of perchloride of mercury. Such minor matters will, doubtless, be remedied in a second edition, which will assuredly be called for in due time, for Mr. Power's work is likely to be of real service, and is to be heartily commended.

"Diseases of the Spinal Cord." By BYROM BRAMWELL, M.D., F.R.C.P. Ed., F.R.S.E., Assistant Physician to the Edinburgh Royal Infirmary, and Lecturer on the Principles and Practice of Medicine in the School of Medicine, Edinburgh. Third Edition. Edinburgh: W. F. Clay, 1895.

IN the third edition of Dr. Bramwell's book the subject matter has been revised and greatly extended. The text has been entirely re-written and

re-arranged in the lecture form. Hence the work is not a text book in the strict sense of the term, but consists of 35 lectures on diseases of the spinal cord. Owing to the lecture form many minor details and references are necessarily omitted, whilst this form of arrangement of the text enables the author to emphasise many points in the symptomatology, diagnosis, and treatment in a manner which would be scarcely suitable to a text book in the strict sense. Thus, for example, the necessity for most careful examination for signs of organic disease before coming to the diagnosis that a case is *merely* one of hysteria, is emphasised better and much more forcibly than would be suitable in a text book.

The chief points of importance in the symptomatology, diagnosis, pathology, and treatment of spinal diseases are well described. The book contains much original matter, pathological and clinical, and a large number of beautiful original illustrations representing various deformities produced by spinal diseases, and the microscopical appearance of section of the cord in a number of affections. Many of the latter are coloured. A useful concluding chapter is devoted to traumatic diseases of the cord and railway spine. We can strongly recommend the book to senior students and medical practitioners as an excellent and very practical account of spinal diseases.

There is one point with respect to the title-page to which we would draw attention. The author's medical qualifications and present medical appointments are given, and then follows a list of *eleven* previous medical appointments, arranged in the form of an inverted pyramid, and finally followed by *etc., etc.* Surely one half of this list of eleven previous appointments, with one *etc.*, would have been sufficient. They form an interesting medical life-history of the author, but we fail to see why it is necessary, after giving the present and more important previous appointments, to inform the reader that Dr. Bramwell was once Medical Officer to the Tyneside Union Workhouse Hospital, to the Prudhoe Convalescent Home, the Tyne Floating Hospital, or that he was once Medical Officer of Health and Police Surgeon of the Borough of Tynemouth. After all, this is, perhaps, merely a matter of taste, but we hope to see the list curtailed in a future edition.

"Medical Handbook of Life Assurance." By JAMES EDWARD POLLOCK, M.D., F.R.C.P., and JAMES CHISHOLM. Fourth Edition. London: Cassell and Co.

WHEN a book has reached its fourth edition it is usually regarded as having passed the stage of criticism. In a general sense this applies to the handbook before us; there are, however, one or two points to which the authors' attention might be advantageously directed with the view of effecting improvements in a subsequent edition.

A constantly recurring difficulty to the practitioner when acting as medical examiner in assurance cases is occasioned by the ambiguous reactions of the urine in certain instances, and, when in doubt, he naturally looks for help to a book devoted to the medical side of life assurance. When describing the process of urine testing, however, Dr. Pollock contents himself with the mention of a few of the ordinary reagents used, without any warnings as to possible errors of interpretation; moreover, several reliable and more delicate methods than those given ought to find a place in a book of this kind, which is supposed to be up to date. When describing the nitric acid contact-test for albumen no mention is made of the possible precipitation of urea-nitrate, nor of the cloudiness which may be produced by the presence of mucin, nor of the necessity for allowing the urine to stand on the acid for five or more minutes before assuming that albumen is absent. The best way of applying the boiling test for albumen is not described. Two useless tests are given—carbolic acid and alcohol—both of which, especially the latter, precipitate, beside albumen, other substances which may be present in urine; in delicate investigations the use of these reagents would be misleading. No adequate caution is given as to accepting the evidence afforded by the reduction of copper in Fehling's solution as proof of the presence of sugar in the urine. This is an important omission, as several grounds of fallacy are involved. We should also have expected to find a description of the phenyl-hydrazin test for glucose. The fermentation test is put aside as being inapplicable in assurance cases, but we are strongly of opinion that it should invariably be resorted to in doubtful cases when other tests for glucose yield ambiguous reactions. The test given for bile-pigment, especially when performed as described, is not the most delicate method of ascertaining the presence of bile in urine; no mention is made of the iodine test. On page 117 it is stated, without qualification, that urine containing pus is alkaline; whereas when the pus is derived from the kidneys the urine may be acid in reaction.

The section on diseases of the nervous system might be improved. In relation to chronic alcoholism, no mention is made of the symptoms of peripheral neuritis, such as cramps in the calves of the legs, paræsthesia of the hands and feet. The description of the symptoms of locomotor ataxy is not very happy; "inequality of steps" and "partial paralysis of muscles" are scarcely to be regarded as being characteristically indicative of the disease.

In offering these criticisms we are actuated by the wish to see a book, which has for so long occupied a useful position in the special branch of medicine on which it treats, kept up to the highest standard.

PUBLICATIONS RECEIVED.

From John Bale and Sons, London :—

“Early Scoliosis.” By PERCY G. LEWIS, M.D.

“London Homœopathic Hospital Reports,” Vol. IV. (6s.) Edited by GEO. BURFORD, M.B., C. KNOX SHAW, and BYRES MOIR, M.D.

“Some Points in the Practice of Lithotrity and Litholapaxy.” By REGINALD HARRISON, F.R.C.S.

From J. F. Beymem, Wiesbaden :—

“Das licht unsere gelbe salbe und die gewöhnlichen salbenkruken.” von S. HOLTH.

“Die syphilitische autoinfection und der harte lidschanker.” von S. HOLTH.

From J. and A. Churchill, London :—

“The Conditions of Radical Cure in Cancer.”

“Tumours of the Breast which are Dispersible without Operation.”

“The Conversion of Benign Tumours into Cancer.”

“The Practical Outcome of Recent Researches on Cancer.”

By HERBERT SNOW, M.D.

From the Johns Hopkins Press, Baltimore :—

“The Johns Hopkins Hospital Reports: Report in Gynecology—III.”

From H. K. Lewis, London :—

“Medical Electricity.” (10s. 6d.) By H. LEWIS JONES, M.A., M.D.

From Macmillan and Co., London :—

“Contribution to the Clinico-pathological Study of Cerebral Localisation.” (Reprint from *Brain*). By JAMES SHAW, M.D.

From Smith, Elder, and Co., London :—

“The Truth about Vaccination.” By ERNEST HART, D.C.L.

From Cassell and Co. :—

The Practitioner, Vol. January—June, 1895.

Local News.

VICTORIA UNIVERSITY.

FACULTY OF MEDICINE.

DEGREE CEREMONY, MONDAY, JULY 29, 1895.

The following candidates were presented for the Degrees of Bachelor of Medicine and Bachelor of Surgery. The names are in alphabetical order.

ARTHUR VERNON DAVIES.....	<i>Owens.</i>
UMEDRAM LALBHAI DESAI	<i>Owens.</i>
ALFRED GREENWOOD.....	<i>Owens.</i>
RICHARD SMITH HARDMAN	<i>Owens.</i>
FRANK BERNARD GREAME HOLMES	<i>Owens.</i>
CHARLES EDWARD LIGERTWOOD	<i>Yorks.</i>
JOSEPH PETER LOWE	<i>Owens.</i>
ALAN MCDOUGALL	<i>Owens.</i>
JOSEPH THOMAS MARSDEN	<i>Owens.</i>
THOMAS HENRY MILLER	<i>Owens.</i>
FREDERICK CRAVEN MOORE.....	<i>Owens.</i>
JOHN HAROLD RENSHAW	<i>Owens.</i>
JOHN VINCENT SHAW	<i>Yorks.</i>
ROBERT HALE TROTTER	<i>Yorks.</i>
BERNARD VINCENT WATKINS	<i>Owens.</i>

The following were awarded honours:—Class I.: C. E. Ligertwood, Yorkshire; F. C. Moore, Owens. Class II.: R. S. Hardman, F. B. G. Holmes, T. H. Miller, J. H. Renshaw, Owens; J. V. Shaw, R. H. Trotter, Yorkshire; B. V. Watkins, Owens.

The following examination lists in the faculty of Medicine for July, 1895, have also been issued. Candidates names are in alphabetical order throughout:—

Final M.B. Examination.

Part I.—George Ashton, Owens; W. S. Badger, University; F. J. Batten, Robert Bleasdale, H. M. Brown, A. H. Burgess, J. B. Clarke, Harold Coates, Charles Coventry, Owens; H. M. Crake, University; P. H. Fearnside, Yorkshire; Harry Hamer, Eustace Hutton, W. F. Jackson, K. H. Jones, A. T. Lakin, Owens; J. G. Martin, University; Ernest Monks, Newman Nield, W. H. S. Nickerson, A. E. Normington,

J. S. Ross, Owens; S. T. Rowling, Yorkshire; E. A. Smith, University; Livsey Tong, Owens; A. A. Wood, University; James Wood, H. B. Woodcock, H. C. Woodhouse, Owens.

Diploma in Sanitary Science.

Malcolm Parkinson, F. W. Sydenham.

Second M.B. Examination.

Anatomy and Physiology.—J. W. Anderson, University; A. G. S. Broughton, Yorkshire; H. M. Cockroft, Owens; William Crozier, University; Herbert Davies, J. I. Halstead, Roland Hamer, J. E. Healey, Owens; S. C. Moore, University; William Sankey, Owens; J. E. H. Scott, Yorkshire; A. T. Sissons, Edwin Stott, Owens.

Materia Medica and Pharmacy.—D. A. Alexander, J. W. Anderson, Mark Aungier, University; J. W. Barber, Yorkshire; George Binna, Owens; J. E. Bolton, Yorkshire; P. J. R. Bucknill, J. J. Butterworth, J. H. Chambers, John Craig, Owens; William Crozier, University; L. O. Delecourt, Owens; Harry Dunk, Yorkshire; E. C. Dutton, Owens; H. M. Fletcher, University; E. W. Floyd, Owens; R. T. Foster, Joseph Goodall, Yorkshire; J. P. H. Greenhalgh, Archer Greenwood, Owens; A. S. Griffith, University; J. I. Halstead, Owens; H. F. Hart, H. M. Henderson, W. S. Henderson, University; E. M. Hime, Yorkshire; J. C. Hindley, Owens; J. A. Howard, University; Frederic Hoyle, Owens; F. W. Inman, University; James Kemp, Owens; H. C. Ling, Yorkshire; F. T. A. Lovegrove, J. E. W. M'Fall, University; H. H. M'Nabb, Owens; H. A. Mawdsley, University; W. T. Melling, R. A. Needham, Owens; Edgar Newhouse, Yorkshire; W. P. Noall, Harry Osborne, Owens; J. A. Reed, Yorkshire; W. H. Richardson, William Rigby, H. H. Smith, Owens; Ambrose Spong, Yorkshire; David Taylor, William Thompson, Owens; Edward Trotter, Edward Turton, Yorkshire; L. S. Whitwam, University; T. H. Wignall, A. G. Wilkins, Owens; G. H. Wyse, University.

First M.B. Examination.

Part II.—Biology.—G. P. Alderson, University; T. P. Allen, Owens; W. J. W. Anderson, J. D. Andrews, Yorkshire; W. E. Bamber, Owens; Herbert Bates, University; A. D. Beckett, Owens; H. M. Birkett, Yorkshire; J. P. Brown, Owens; P. A. Browne, Robert Burnet, J. S. Byrne, University; H. H. Bywater, A. H. Capamagian, A. C. Clarke, Owens; W. R. A. Coates, Yorkshire; E. R. Cooper, C. H. Dawson, Owens; S. S. Depree, University; E. W. Falconer, Owens; C. H. Ferguson, University; A. E. Finney, F. H. Flack, Mercier Gamble, Charles Garner, J. P. Good, Reginald Gordon, Owens; C. H. Greenwood, Yorkshire; E. F. Hill, Owens; H. C. R. Hime, Yorkshire;

Henry Holt, Owens; C. E. Horsfall, Yorkshire; S. K. Hutton, Owens; W. A. Illingworth, Yorkshire; A. R. Jackson, University; F. W. Johnson, Yorkshire; W. C. Johnson, Owens; E. W. Kemp, Yorkshire; W. R. Kemp, Owens; J. E. H. Lambert, Yorkshire; L. R. Lempriere, Owens; Hugh Lett, Yorkshire; S. F. Linton, University; C. J. N. Longridge, R. H. Martin, H. J. Moon, R. F. Moore, F. A. Morrison, Owens; W. H. Morrison, Yorkshire; William Parker, J. H. Part, A. E. Rayner, T. E. Regan, W. H. Russell, Owens; G. M. Sharpe, Yorkshire; C. E. Silvester, Harold Snape, J. H. Stephens, Owens; Edward Swales, A. B. Sykes, University; W. H. Tattersall, Owens; T. J. Thomas, University; J. W. Watson, J. A. Welsh, Owens; S. C. Wilkinson, Yorkshire; R. D. Willcocks, University; H. W. Whiteley, P. G. Williamson, W. J. Woodyatt, Ernest Young, Owens.

UNIVERSITY OF LONDON.

The following names appear in the "Pass" and "Honours" lists of recent examinations :—

Intermediate Examination in Medicine, July, 1895. Pass List.

Entire Examination.

Division I.—H. Hartley, Owens College. Division II.—J. Broadley, Yorkshire College; R. C. Field, Yorkshire College; W. J. Hirst, Yorkshire College; J. Mooney, Owens College; J. H. Sheldon, Owens College; A. B. Smallman, Owens College; J. E. Smith, University College; W. Wright, Owens College.

Excluding Physiology.—Division II.—J. A. Mawson, Yorkshire College.

Examination for Honours.

Anatomy.—Class II.—W. A. Dewhirst, Yorkshire College. Class III.—E. C. Morland, B.Sc., Owens College and St. Bartholomew's.

Physiology and History.—Exhibition and Gold Medal, E. C. Morland, Owens College and St. Bartholomew's; R. Kelsall (gold medal), Owens College. Class II.—J. F. Dobson, Yorkshire College.

Organic Chemistry.—Class II.—E. C. Morland, Owens College and St. Bartholomew's.

Preliminary Scientific (M.B.) Examination. Pass List. Entire Examination.

Division I.—H. R. D. Ford, Owens College; O. M'Dougall, Owens College; A. S. Parkinson, Yorkshire College. Division II.—H. Collinson, Yorkshire College; L. E. Dickson, University College, Liverpool; L. H. Guest, Owens College; F. E. Hampshire, Yorkshire College; W. C. Hirst, Yorkshire College; A. Mooney, Owens College; H. Scholefield, Owens College; P. R. Wrigley, Owens College.

Chemistry and Experimental Physics.—J. M. Birnstein, Owens College; W. J. Butcher, Owens College; O. W. A. Lowe, University College, Liverpool; J. E. Utley, Owens College.

Biology.—J. A. C. Forsyth, Yorkshire College; E. Nelson, University College; T. C. Orford, Owens College.

THE OWENS COLLEGE.

The course of Clinical instruction on Diseases of Women at the Southern Hospital, Manchester, given by Dr. W. J. Sinclair, Professor of Obstetrics and Gynæcology at the Owens College, is now recognised as fulfilling the requirements of the Royal College of Surgeons of London.

A. E. BRINDLEY, M.D.Lond., M.B., B.Ch., B.Sc.Vict., has been appointed Resident Medical Officer to the Manchester Royal Infirmary.

HERBERT HORROCKS, B.Sc., M.D.Lond., M.B., B.Ch.Vict., has been appointed Resident Medical Officer to the Brompton Hospital for Consumption and Diseases of the Chest.

ALAN McDUGALL, M.B., B.Ch.Vict., has been appointed Assistant Medical Officer to the Manchester Union Hospital, Crumpsall and New Bridge Street.

ALEXANDER McDUGALL, M.B., B.Ch.Vict., has been appointed Resident Medical Officer to the Birmingham Union Hospital.

J. W. SMITH, M.B., F.R.C.S., has been appointed Assistant Anæsthetist to the Manchester Royal Infirmary.

OWENS COLLEGE STUDENTS AT THE ARMY MEDICAL SCHOOL, NETLEY.

JOHN STEPHENSON, M.B., B.Sc., with 5,921 marks obtained the first place in the examination for the Indian Medical Service, and gained the Herbert Prize of £20, the Parkes Memorial Medal, the Martin Memorial Medal, and the prize in Pathology. F. N. WINDSOR was placed second with 5,127 marks, and ALFRED HOOTON seventh with 4,467 marks.

MANCHESTER ROYAL INFIRMARY.

The following appointments have been made for the ensuing six months :—

House Physicians.

R. J. WARRINGTON, M.R.C.S., L.R.C.P.

J. S. TAGGART, M.B., Ch.B.(Vict.).

House Surgeons.

R. D. CRAN, M.R.C.S., L.R.C.P.

F. C. MOORE, M.Sc., M.B., Ch.B.(Vict.).

E. W. BATTLE, M.R.C.S., L.R.C.P.

J. P. HALL, M.B., Ch.B.(Vict.).

THE MEDICAL CHRONICLE:

A MONTHLY RECORD OF THE

Progress of Medical Science.



OPERATIVE TREATMENT OF INTESTINAL PERFORATION RESULTING FROM TYPHOID FEVER.

By J. E. THOMPSON, M.B., B.S., F.R.C.S.,
Professor of Surgery, University of Texas.

OPERATIVE treatment in perforation of the intestine, resulting from typhoid ulceration, has occupied my attention during the last few years, owing to the fact that it has been my luck to have operated on two cases, in neither of which a diagnosis was suspected beforehand.

Case 1 was an engineer on a British ship, which had been in port one week, coming direct from Gibraltar, where water had been taken on board, and taking four weeks for the passage.

The patient had been a little languid and feverish for some time, but had been able to attend to his work up to the previous Wednesday, when he was suddenly seized with severe pain in his belly, followed in a few minutes by vomiting.

On Sunday I was called in consultation, and found the following condition: The face was somewhat flushed but not haggard, temperature 103° F., pulse 120, small and thready; respirations 25 to the minute, and shallow. The abdomen was immensely distended, the enlargement being uniform. Percussion revealed resonance everywhere, but there was no obliteration of liver dulness. Tenderness was extreme, but not confined to any distinct area. Pain was intense, and was referred to the umbilical region. There was repeated vomiting of bilious fluid, and troublesome hiccough.

On analysing the symptoms I was somewhat at a loss to account for the peritonitis. There was no caecal tenderness, and the history of previous illness was very indefinite.

Recognising that operative interference offered the only chance of recovery, at 3 p.m. (Sunday) I opened the abdomen by a long median incision, extending from the pubes to an inch above the umbilicus. A large quantity of sanious semi-purulent fluid escaped, and escaping distended coils of small intestine were received into hot bi-chloride towels. On passing two fingers towards the caecum, I opened a large collection of fluid, containing flakes of lymph and faecal matter. Finding that the distended intestines interfered with a thorough examination of the abdomen, I punctured one of the distended coils with a large trochar and canula, and succeeded in removing about two quarts of faecal matter through this opening, which was immediately closed up with three Lembert's sutures. Following the mesenteric attachment of the small gut towards the right iliac fossa, I now proceeded to examine the intestine, inch by inch, and suddenly came upon a perforation in the ileum, situated about 12 inches from the ileo-caecal valve. The perforation was oval in shape, length one-fourth of an inch, breadth about one-eighth of an inch, edges clean cut, greyish, and surrounded by a zone of intense inflammation. Three interrupted sutures were passed through the edges of the ulcer, and the serous coat brought together by a continuous silk suture. This procedure was very difficult, owing to the friable state of the diseased coat of the bowel. As a further precaution, three or four interrupted sutures were passed to strengthen the others. When the sutures were completed the calibre of the bowel was narrowed fully one-half. The abdominal cavity was then carefully and thoroughly irrigated with hot boracic lotion, and a drainage tube inserted into Douglas's pouch.

The abdomen was now closed, and the patient, already much collapsed, taken to bed. Two injections of $\frac{1}{30}$ gr. of strychnia were given within an hour, and within two hours the patient had completely rallied from the operation. This improvement continued until midnight, but then the patient began to sink and died at 2 a.m. (Monday). The post-mortem examination revealed the characteristic lesions of typhoid fever; numbers of inflamed and ulcerated Peyer's patches, enlarged mesenteric glands and enlarged spleen. The perforation was perfectly water-tight, and plastic lymph had been thrown out over the sutures.

Case 2.—A. C., an Italian, was admitted into the Sealy Hospital on March 30th, 1894. No history was obtainable except that he had been ailing for a week or two. His condition was very critical: the features were pinched; complexion yellow, eyes sunken and cheeks cadaverous;

pulse 120 and very feeble; respiration 24 to the minute; temperature subnormal.

Abdominal inspection revealed a uniform distension and tympanitic resonance. Liver dulness was absolutely obliterated. Vomiting was absent.

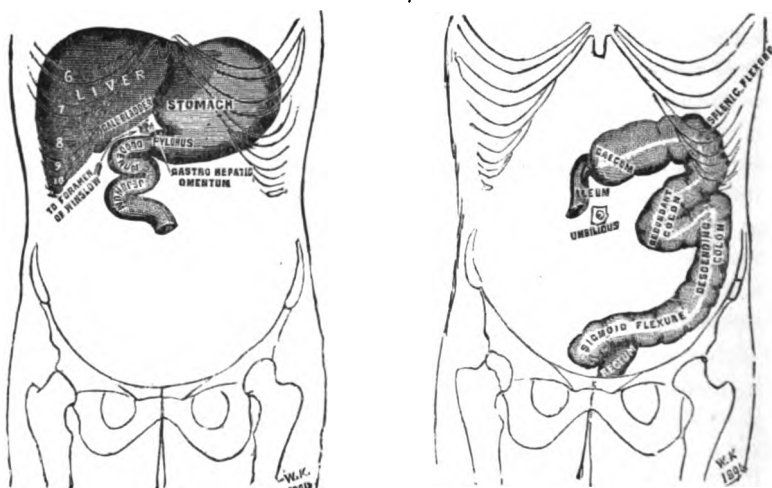
A large enema was given, but had no effect in relieving the abdominal distension.

I opened the abdomen by a long median incision extending from the pubes to a point about two inches above the umbilicus. Gas of an offensive faecal odour and a slight amount of fluid at once escaped. On examining the right iliac fossa I could find no trace of the caecum. Intensely congested and distended small intestine escaped through the wound, and their contents were evacuated by two longitudinal slits which were immediately closed up by continuous silk sutures. A long hank of colon projected into the wound, and its long meso-colon caused some surprise. The small intestine was now followed towards the ileo-caecal valve, and its mesenteric attachment to the posterior body wall sprang from the left side of the body of the second lumbar vertebra. On tracing it upwards towards the duodenum the mesenteric attachment passed to the right across the front of the body of the second lumbar vertebra, and the gut seemed to be adherent to the under surface of the right lobe of the liver and the right side of the second lumbar vertebra.

Owing to the absence of the caecum from the right iliac fossa I thought that it had perhaps retained its embryonic position in the left hypochondrium, and passing my hand towards the splenic region, I seized a hard mass which, when pulled into the wound, proved to be the caecum, on the anterior surface of which was a perforation fully three-quarters of an inch long, across which was stretched a diaphragm of dead mucous membrane perforated with two holes. The caecum was entirely covered by peritoneum, intensely inflamed; its mesentery was fully four inches long, and contained a chain of enlarged lymphatic glands. The vermiform appendix was perfectly healthy.

The caecum was in such a disorganised state that I hesitated about excising and suturing the rent, so I quickly excised the diseased gut and brought the two ends of the intestine out of the wound. The abdominal cavity was then flushed with sterilised water and drained by two tubes, one passing up to the splenic region, the other into Douglas's pouch. The patient only lived eight hours. The autopsy revealed half a dozen typhoid ulcers in the small intestines, none of which had penetrated deeper than the mucous membrane. The mesenteric glands and spleen were enlarged and softened.

It was particularly the arrangement of the gut and the origin of the mesentery from the body wall that engaged our attention. The cæcum had maintained its original embryonic position in the left hypochondrium, and had not passed, as it usually does, into the right hypochondrium, and thence into the right iliac fossa. Commencing with the rectum, and tracing upwards, the sigmoid flexure had a length of two feet, and a mesentery fully ten inches long. Then came the descending colon, firmly attached to the left lumbar region, and possessing no mesocolon. After this, a redundant piece of colon with its mesentery attached to the posterior body wall, just below the spleen, and of such a length that it had allowed this hank of gut to project through our abdominal incision. Then came the splenic flexure, attached by its normal fold of



CASE 2.—Diagrams illustrating anatomical abnormalities.

peritoneum (colico-splenic ligament) to the diaphragm just below the spleen; and lastly, the commencement of colon, about six inches long, which extended downwards to the right, as in the diagram. The cæcum, which had been removed during operation, occupied the angle where the left hypochondrium joins the epigastric and umbilical regions.

The mesentery, slinging the small intestine to the body wall, instead of being normally attached along a line extending from the left side of the body of the second lumbar vertebra, sprang from a line transversely across the second lumbar vertebra from left to right.

The upper four or five inches of jejunum lay on the posterior body-wall to the right of the upper lumbar vertebra, and were covered by peritoneum in front and on the sides only. This portion of gut passed

by an acute curve into the duodenum, which had its usual relations to the peritoneum, but was situated entirely to the right of the spinal column.

The pancreas lay in the U curve of the duodenum. The lesser sac of the peritoneum was present, but did not extend so far downwards and to the left as usual.

The anatomical peculiarities here were almost a facsimile of the conditions occurring in early foetal life, when the intestine is an almost straight tube, slung up to the body wall by a simple mesentery, along which run the vessels.

Perforation, although easily diagnosed in the majority of cases, may be attended by so few symptoms that we may completely overlook it. Such a case came under my observation, where perforation of the ileum with extravasation of faecal contents was found at the post-mortem examination of a patient who had died from exhaustion in the fourth week of an attack of typhoid.

Again, death may occur in ten minutes from the onset of the first symptom.*

When the signal symptoms—viz., intense sudden abdominal pain, fall of temperature, collapse, and quick onset of tympanites, followed by evidence of peritonitis—are present, we cannot fail to make a diagnosis.

The passage of gas into the peritoneal cavity may occur quickly or slowly. When it leaks quickly through the rent, the liver dulness may be obliterated in a few hours; in fact, it may be impossible to map out any of the abdominal viscera, the belly being tense and distended like a barrel. If it leaks out slowly, the liver dulness may be present, tympany may be a minor symptom, and peritonitis may be comparatively localised. Obliteration of the liver dulness then is anything but an absolute sign. It is more likely to occur after perforation of the gastric ulcers situated on the anterior surface of the stomach and perforations of the transverse colon. It may also be present where a distended loop of colon intervenes between the liver and the anterior abdominal wall.

Is operation ever justifiable in such a condition? My answer to this is an unhesitating Yes, if there seems to be the slightest chance of recovery.† Spontaneous recovery does, in rare cases, follow perforation, but these are mere pathological curiosities, and should in no way guide us in determining a line of treatment. Spontaneous recovery follows some cases of acute perforative appendicitis, but no surgeon would decline to interfere, because nature had indicated a way of self cure.

* PEARCE GOULD. *British Medical Journal*, October 20, 1894, p. 863.

† Cayley has seen six recoveries. PEARCE GOULD. *Loc. cit.*

If there seems to be the slightest chance of recovery no surgeon has a right to refuse to give his patient a ray of hope. No idea of good statistics should enter a conscientious man's mind at such a juncture, but he should straightway proceed to the only means at his disposal, viz., removal of the extravasated material. In most cases the hope is a forlorn one, because we have not alone a local condition, but a severe constitutional disease, which might destroy life of itself. Again, perforation rarely occurs before the end of the third week, when the patient is in an extremely exhausted condition, which would debar any procedure approximating a post mortem on the operating table.

The technique of the operation is the same as that for suppurative peritonitis. We must operate immediately, and with as little disturbance to our patient as possible. A median incision is the best, and if necessary, it should be prolonged into the epigastric region. The bowels should be received into warm moist towels, and if unduly distended, may be punctured in two or three places, and the contents thoroughly evacuated. There is absolutely no increased danger in this procedure, which places the patient in a much better condition to resist septic poisoning, and allows the coils of gut to be returned to the belly cavity without undue force.

Search should be made for the perforation, which is usually found without difficulty, unless it is situated quite close to the ileo-cæcal valve. When found, a simple interrupted suture of silk should be passed through the margins, and the serous surface of the gut brought into accurate contact by interrupted Lembert's sutures deeply buried, and pulled as tight as the softened state of the bowel will allow. This procedure will suffice for small perforations, but for large ones, merely bringing the edges together would narrow the intestine too much to allow the faecal contents to pass; or, in certain cases, the ulcer may have destroyed the greater part of the gut, and so rendered the procedure an absolute impossibility. We then have a choice of two methods—

- (1) The formation of an artificial anus with or without excision of the affected portion of the gut.
- (2) Excision of the affected portion of gut, with immediate union of the divided ends.

The first procedure deserves great consideration, and is probably the best method of treating these cases, for it gives us a means of evacuating the intestinal contents, and cleansing the intestine both above and below by repeated lavages. We can also, if thought advantageous, treat the ulcers in the immediate neighbourhood with antiseptic lotions.

The principle involved in the thorough evacuation of the bowel opens up the great question of the rational treatment of acute suppurative

peritonitis. It is well known that an acute suppurative peritonitis of more than 48 hours standing is almost invariably fatal, the result being due to septic absorption of the products produced by the bacterium coli commune. This organism, which is harmless when the intestine is healthy, becomes virulent when the gut is inflamed; and when intestinal distension and paralysis occur, the bacteria pass in great numbers through the diseased bowel wall, thus adding to the already serious state of affairs.

The relief of intestinal distension is quite as important as the removal of morbid products from the peritoneal cavity, and this can only be accomplished by free evacuation of the distended coils with a large trochar and canula, or, better still, by incising the gut with a scalpel. In many cases it is absolutely necessary to establish a fæcal fistula, as has been shown by Henrotin* and Hadra†; while Lockwood‡ ascribed one of his successes to the formation of an accidental fæcal fistula. I, myself, had occasion to make a second fæcal fistula on Hadra's case, and the immediate result of the relief of intestinal distension on the pulse and temperature was marvellous.

The second alternative, that is, immediate union of the divided ends of the excised gut, is an operation requiring some time for its performance, and, as our efforts are usually occupied with diminishing shock by quick operations, very few cases are likely to occur where such a procedure will be found advisable.

A glance at the following analysis of cases will show the status of the operation up to the present. Out of 23 operations there have been only four recoveries, and three of these are probably spurious, leaving only one unequivocal case on record (Van Hook's).

* HENROTIN. *American Journal of Obstetrics*, August, 1893, p. 199.

† HADRA. *New York Medical Journal*, June 2, 1894.

‡ LOCKWOOD. *Lancet*, October 27, 1894, p. 975; *British Medical Journal*, *ibid.*, p. 919.

HOWARD MARSH. *Lancet*, October 27, 1894, p. 973.

Operator and Date.	Reference.	Number of Cases and History.	Result.
Mickulics, 1884.	Contributed to the Fifty-seventh Assembly of the German Physicians. (Quoted by Charles Louis, <i>Progrès Méd.</i> , December 27, 1890, p. 512.	One case. Perforation doubtful.	Recovered.
Lücke, 1885. (Kussmaul's Clinic.)	<i>Deutsche Zeitschrift für Chirurgie</i> , October, 1885.	One case. Resection of intestine.	Death in eleven hours.
Escher, 1886.	<i>Wien. med. Wochenschrift</i> , 1887, Seit. 607.	One case. When operating for a scrotal hernia he accidentally opened a sac full of foetal fluid which communicated with the peritoneal cavity. Cavity washed out. Diagnosis doubtful, but probably appendicitis.	Recovered.
Bartleet, 1886.	Quoted by S. K. Morton. <i>Phila. Med. News</i> , November 26, 1887, p. 617.	One case. Diagnosis doubtful. Opened abdomen and washed out a purulent collection.	Death on second day.
Greig Smith, 1886.	"Abdominal Surgery," 3rd edition, 1890, p. 751.	One case. Diagnosis doubtful. Opened abdomen and washed out a purulent collection.	Death in four weeks.
Bontecou, 1887.	<i>Journ. of Amer. Med. Assoc.</i> , 1888, p. 106.	One case. Perforation in ileum sutured and vermiform appendix resected.	Death in a few hours.
Morton, 1887.	<i>Phila. Med. News</i> , December 24, 1887, p. 730.	One case. A walking case of typhoid. Perforation in ileum sutured.	Death in six hours.
Bontecou, 1889.	<i>Journ. of Amer. Med. Assoc.</i> , 1890, Vol. XIV., p. 455.	One case. Perforation in ileum sutured.	Death on the following day.
Senn, 1889.	<i>Phila. Med. News</i> , June 8, 1888. (Quoted by Louis.) <i>Loc. cit.</i>	One case. Volvulus and perforation. Resection of the bowel.	Death in ten hours.
Hahn, 1889. Reported by Frank.	<i>Beiträge zum Centralblatt für Chirurgie</i> , 1889. (Quoted by Louis.)	Two cases.	Two deaths.
Kimura, 1890.	<i>Lei Kwai Med. Journ.</i> , Tokio, Japan, IX., 1890, pp. 55 and 57. <i>Brit. Med. Journ.</i> , 1890, Vol. II., p. 777.	One case. Perforation in ileum sutured.	Death in nine hours and a half.
Taylor, 1891.	<i>Lancet</i> , Vol. I., 1890, p. 961.	One case. Operated on two days after the onset of the symptoms. Diagnosis somewhat doubtful.	Recovered.
Van Hook, 1892.	<i>Phila. Med. News</i> , Vol. LIX., p. 591.	Three cases. Histories very complete. Perforation secured in successful case by three rows of Lambert's sutures. In one case the patient nearly died on the table and the operation was not completed.	One recovery. Two deaths.
Bell, 1892.	(Private communication.) Montreal General Hospital.	One case. Operation performed thirty-four hours after the symptoms of perforation. Perforation sutured by a diagonal row of stitches.	Death in twenty-four hours.
Bell, 1893.	(Private communication.) Montreal General Hospital.	One case. Operation performed forty-eight hours after symptoms of perforation. Perforation closed and appendix removed.	Death in sixty-two hours.
Bland Sutton.	<i>Trans. Clin. Soc.</i> , Vol. XXVIII., p. 187. (Quoted by Pearce Gould, <i>Brit. Med. Journ.</i> , October 20, 1894.	One case. Operation performed December 1, 1893. Five and a half hours after the operation the ulcer was excised and the mucous membrane united by continuous silk sutures. Peritoneal coat secured by Lambert's sutures.	Death on the sixth day after operation.
Parkin, 1894.	<i>Brit. Med. Journ.</i> , January 20, 1895.	One case. Operated on a few hours after the symptoms of perforation occurred.	Death in seventy-two hours.
Hare, 1895.	<i>Intercolonial Quart. Journ. Med. and Surg.</i> , <i>Brit. Med. Journ.</i> , Epitome, April 20, 1895.	One case. Perforation evidently sutured.	Death.

THE AUSCULTATORY SIGNS, ETC., OF MITRAL STENOSIS : A STATISTICAL ENQUIRY.

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THERE are two methods of study that may be made use of in clinical medicine : one by which we form general conceptions from the impressions of facts received by our minds in daily practice, the other by which we make a record in writing of important facts as we elicit them at the bedside, such records being afterwards collated for the purpose of statistical investigation. It is unnecessary for me to express any opinion as to the relative merits of the two methods, inasmuch as I hold that when it is our object to study any group of clinical cases we shall do well to adopt both methods. Should the former method, as is possible, have led us into error, the latter will go far to correct such error. An opinion must be a weakly based one indeed if its author be not prepared to submit it to "*la force brutale de chiffres*."

In the pages of this Journal (March, 1888), I gave an account of the auscultatory signs of mitral stenosis, as I stated, "based on my own personal experience of them during the preceding fifteen years, and embodying a statement of the views which that experience had led me to accept"—an account, thus, the result of the former of the two methods of study under consideration. With upwards of seven years' additional experience, I now submit the views then expressed to the second or numerical method. What divergence there may be in the conclusions to be drawn from the results of the two methods of study respectively I will refer to at the end of the paper.

I determined, first of all, to take a group of fifty hospital cases as a convenient number for statistical enquiry, but from a variety of circumstances, which need not be narrated, points of importance for collation had been occasionally omitted, so that to get at least fifty cases perfect as regards each feature to be submitted to study, it became necessary either to *select* fifty cases perfectly noted or to include a considerable "*margin*." Holding that selection is a process destructive of reliable statistical enquiry, I adopted the latter plan, and made the group one of sixty instead of fifty cases. The clumsiness of the figure I disregarded, seeing that it hardly concerned the convenience of the reader, inasmuch as the results obtained would be stated in percentages.

I now subjoin my clinical records, for which I may say I am immediately responsible. It is in no spirit of disparagement of the work of my clinical clerks that I have acted thus, for I have had in view all along the ultimate collation of the results obtained by clinical observation, and such observation, for the purpose indicated, should be the observation of one mind.

No.	Name.	Age	Antecedents.	Physical Signs.
1	Sarah A.	37	No rheumatism. No chorea. Suffered as a girl from palpitation after exertion.	III. Mitral area: Accentuated first sound; 1-0½ systolic murmur; second sound. Tricuspid area: Systolic murmur; second sound. Aortic area: First sound; second sound. Pulmonary area: First sound; slight murmur; accentuated second sound. Later, first sound accentuated in mitral area, where a diastolic murmur heard. This latter audible to left of lower sternum. Double second sound. Still later, presystolic murmur in mitral area.
2	Alfred B.	18	Acute rheumatism for three weeks before admission. No previous rheumatism.	III. Mitral area: Systolic and diastolic 2-6 murmurs, latter accompanied by thrill; indistinct "galop"; systolic sound and murmur at back. Tricuspid area: Loud systolic murmur; second sound impure, "slightly reduplicate." Pulmonary area: Systolic murmur; loud second sound. Later, presystolic murmur and thrill at apex.
3	Isabella B.	44	Rheumatic fever, set. 18, 21, and 25.	II. Mitral area: First sound; systolic 4-5½ murmur; second sound; no murmur audible at back. Tricuspid area: Systolic murmur; second sound. Aortic area: Systolic murmur; second sound. Pulmonary area: Systolic murmur; accentuated second sound.
4	Sarah J. B.	23	No acute rheumatism. Doubtful history of subacute rheumatism following influenza two years before admission.	III. Mitral area: Systolic murmur, dias- 1½-4½ tolic murmur, the latter feeble and short; sharp first sound at back. Tricuspid area: Loud systolic murmur; second sound. Aortic area: Systolic murmur; second sound. Pulmonary area: Systolic murmur; second sound accentuated. A few days later note—"Heart's action excited; first sound rather thumping, and slight diastolic murmur at apex." Still later, marked reduplication of second sound to left of sternum, and a diastolic murmur (not harsh) at the apex. The diastolic murmur is audible over lower half of sternum. Later, tendency to "galop."
5	Fanny B.	20	Rheumatic fever and chorea 7 years before admission; again 1 year before admission.	II. Mitral area: Some first sound; sys- 2½-5½ tolic murmur; second sound; systolic murmur loud at back. Tricuspid area: Systolic murmur; second sound. Aortic area: Systolic murmur; second sound. Pulmonary area: Systolic murmur; second sound; and later, double murmur, systolic and diastolic. At apex and over ventricles, diastolic murmur accompanied by thrill; double second sound.

No.	Name.	Age	Antecedents.	Physical Signs.
6	Robert B.	27	Rheumatic fever five years before admission.	III. 1½-6 (Apex beat in 6th space). Mitral area: Systolic murmur: feeble second sound; systolic murmur audible at back. Tricuspid area: First sound; systolic murmur; second sound. Aortic area: First sound; systolic murmur; second sound. Pulmonary area: First sound; systolic murmur; second sound. Later, an apex diastolic murmur developed, also reduplication of second sound. Later, slight first sound, with murmur at apex.
7	Emma B.	30	No rheumatism or chorea.	III. 1½-4½ Mitral area: Presystolic murmur; accentuated first sound; systolic murmur not conducted to back.
8	James H. B.	24	Rheumatic fever when young child; several attacks since.	III. 1½-6 Mitral area: First sound; systolic murmur; second sound reduplicate; diastolic murmur with fremitus. Tricuspid area: First sound; second sound. Aortic area: First sound; second sound. Pulmonary area: First sound; second sound. Later, presystolic murmur. It was noted also that the first sound was audible at the back without murmur.
9	W. B.	20	Rheumatic fever, æt. 15, also 4 months before admission.	III. 1½-5 M.A.: Presystolic murmur; first sound; double second sound; diastolic murmur; first sound audible at back. T.A.: First sound; systolic murmur; double second sound; diastolic murmur. A.A.: Systolic and diastolic murmurs, but neither first nor second sound obliterated. P.A.: First sound; systolic murmur; second sound accentuated; diastolic murmur.
10	Thomas B.	29	Neither rheumatism nor chorea.	III. 2-6 M.A.: First sound loud; musical systolic murmur accompanied by thrill. T.A.: Systolic murmur; second sound. A.A.: Systolic murmur; (second sound?) P.A.: Systolic murmur; accentuated second sound.
11	Agnes C.	43	Rheumatic fever, æt. 12, and several subsequent attacks. Hands deformed from old arthritis, chiefly of metacarpophalangeal joints.	III. 1½-4½ M.A.: Systolic murmur; second sound; murmur not well conducted to back where sharp first sound is audible. T.A.: First sound; systolic murmur; second sound. (On readmission a soft blowing diastolic murmur audible in this region.) P.A.: First sound; systolic murmur; accentuated second sound. A.A.: First sound; second sound. (On readmission systolic murmur present, and second sound noted to be not quite pure.) Later note—"A soft blowing diastolic murmur, very distinct to left of lower half of sternum."
* Mention of the second sound probably accidentally omitted.				

No.	Name.	Age	Antecedents.	Physical Signs.
12	Thomas C.	40	Rheumatic fever, set. 24, two subsequent attacks; last 11 years before admission.	III. On admission no murmur could be heard, though carefully sought for; both sounds, free from murmur, were alone present. Later, very loud musical systolic murmur audible all over cardiac region, and, in fact, over most of the chest. Murmur quite plain in region of angle of scapula behind. "Over the heart in front murmur could be heard an inch from surface of body." The first sound was not entirely inaudible. Second sound audible. On several occasions the murmur disappeared again as on admission. Over the ventricle pronounced systolic thrill. Thrill felt in epigastrium on pressing finger inwards and upwards below xiphoid cartilage. Epigastric impulse powerful and heaving.
13	Ada C.	20	Rheumatic fever 18 months before admission.	II. M.A.: Systolic murmur; second sound; systolic murmur audible at back. T.A.: First sound: systolic murmur; second sound. P.A.: Systolic murmur; second sound. A.A.: Systolic murmur; second sound. Later, second sound reduplicated "over ventricles to left of sternum." Three days after admission diastolic murmur at the apex, best heard to the left of and above the same.
14	Lucy C.	31	Subacute rheumatism 6 years before admission.	III. Epigastric impulse well-marked. 1-4½ Apex impulse less so. M.A.: "Thumping" first sound not quite pure; second sound feeble. T.A.: Systolic murmur; second sound. P.A.: First sound, slight murmur; second sound. A.A.: First sound; second sound. Later, a diastolic murmur was noted as audible at the apex; and still later, "a blowing diastolic murmur was heard down the sternum from as high as the second cartilages." Readmission, with simple systolic murmur, but a fortnight later the diastolic murmur was noted as "again distinct."
15	John D.	15	Rheumatic fever, set. 5. No chorea.	Great bulging of cardiac area. M.A.: Rather sharp first sound; high pitched systolic murmur; double second sound; slight diastolic murmur; systolic murmur audible at back along with first sound. T.A.: Systolic murmur; loud second sound. A.A.: Systolic murmur; second sound. P.A.: Systolic murmur; double second sound. Double second sound and diastolic murmur are well heard to the left of the sternum low down to the right of the apex-beat. A fortnight after admission diastolic thrill at the apex. Systolic murmur now musical. Pulse 36 (bigeminal 72). Systolic murmur and sound at the back. Later, pure sound at back; slight presystolic murmur and thrill at the apex; first sound much accentuated; presystolic and diastolic thrills at apex.

No.	Name.	Age	Antecedents.	Physical Signs.
16	Louisa G.	49	Chorea, set. 6 or 7.	III. M.A.: Somewhat accentuated first sound; slight systolic murmur audible at times; second sound. T.A.: First sound not quite pure; second sound. A.A.: First sound; second sound. P.A.: First sound; second sound.
17	Ann Maria H.	24	Rheumatic fever, set. 18.	III. M.A.: Presystolic murmur; first sound double; second sound; diastolic murmur. T.A.: First sound; systolic murmur; second sound. P.A.: Systolic murmur; accentuated second sound. A.A.: First sound; second sound.
18	Anna H.	36	Chorea, set. 18.	II. $1\frac{1}{2}$ -5 (Puls. in second space, close to sternum). M.A.: First sound; systolic murmur; second sound; diastolic murmur; (first sound varies, sometimes it is almost replaced by murmur, at other times heard along with it); systolic murmur audible well round to back. A.A.: First sound impure; second sound. P.A.: First sound; systolic murmur; reduplicate second sound; diastolic murmur. T.A.: Systolic murmur; second sound not quite pure. To the left of the sternum a loud diastolic murmur; the diastolic murmur to the left of the sternum has its maximum intensity in the second and third spaces.
19	Sarah H.	52	Scarlatina, followed by rheumatism, set. 7. Subject to rheumatism since.	III. M.A.: Accentuated first sound with occasional systolic murmur. Later, accentuated first sound; double second sound; diastolic murmur over ventricles. Later, diastolic murmur with double second sound audible over the lower part of the sternum.
20	Alice H.	18	Rheumatism 7 weeks before admission. No history of previous attack or of chorea.	III. M.A.: Presystolic murmur; accentuated first sound; systolic murmur; double second sound; diastolic murmur; systolic sound and murmur at back. T.A.: Both first and second sound present, but both accompanied by murmur; second sound reduplicate. A.A.: Both sounds present, but neither pure. P.A.: Systolic murmur; double second sound; slight murmur. Presystolic and diastolic thrills at apex.
21	Fred H.	21	Doubtful rheumatism.	III. M.A.: Systolic murmur; double second sound; diastolic murmur; at times a presystolic murmur and first sound; first sound, audible at back with slight murmur. T.A.: Systolic murmur; double second sound; diastolic murmur feebly audible. A.A.: Systolic murmur; second sound. P.A.: Systolic murmur; double second sound. Later, diastolic murmur audible over the sternum up to level of third cartilages.

No.	Name.	Age	Antecedents.	Physical Signs.
22	Eliz. H.	50	Rheumatic fever, set. 15. Several attacks later.	III. A.A.: Systolic murmur; second sound. M.A.: Systolic murmur; second sound. Murmur not audible at back. T.A.: Systolic murmur; second sound; diastolic murmur. P.A.: Systolic murmur; second sound; diastolic murmur. Double second sound audible at times to left of sternum and at apex. A diastolic murmur was noted only between sternum and left nipple, in which situation systolic murmur was noted as "loud." Latterly, slight pericardial friction.
23	Emily H.	30	No rheumatism. No chorea.	M.A.: First sound; systolic murmur; double second sound; diastolic murmur; systolic murmur not conducted to back. T.A.: First sound; systolic murmur; second sound. P.A.: First sound; slight murmur; double second sound. A.A.: First sound; double second sound.
24	Wm. H.	22	No rheumatism. Chorea, set. 17.	III. On admission, systolic murmur in all areas, followed by second sound; mitral murmur not conducted to back. Later, a presystolic murmur and double second sound became temporarily audible. Patient readmitted eighteen months later with mitral systolic murmur well conducted to the back, but later, the first sound replaced it there.
25	Emma J.	42	Rheumatism in feet, set. 18. No chorea.	II. 1-4 M.A.: Presystolic murmur; accentuated first sound. T.A.: Accentuated first sound; second sound. A.A.: Accentuated first sound; second sound. P.A.: Accentuated first sound; second sound. Later, a diastolic murmur was heard down the sternum, all over, from top to bottom. At the apex, a diastolic murmur became audible also, and was here accompanied by thrill, as was also the presystolic murmur.
26	Ann K.	42	No rheumatism. No chorea.	III. 1-5 M.A.: Loud systolic murmur; little first sound preserved; second sound feeble; at back, first sound distinct and free from murmur. T.A.: First sound; slight systolic murmur; second sound. A.A.: First sound; second sound. P.A.: First sound; second sound.
27	Florence L.	32	Acute rheumatism 4 years before admission.	III. 2-3 M.A.: Accentuated first sound; double second sound; long diastolic murmur accompanied by thrill. T.A.: First sound slight systolic murmur; diastolic murmur. A.A.: First sound; slight murmur; second sound; slight murmur. P.A.: First sound; accentuated second sound; diastolic murmur. The diastolic murmur is heard over the sternum from the second cartilage downwards, also over the ventricles. Later, a presystolic murmur audible at apex.

No.	Name.	Age	Antecedents.	Physical Signs.
28	Sarah M.	22	Acute rheumatism, set. 17, 19, and 20.	III. M.A.: First sound; loud systolic $1\frac{1}{2}$ -4 $\frac{1}{2}$ murmur; absent second sound; sound and murmur audible at back. T.A.: First sound; loud systolic murmur; second sound. A.A.: Systolic murmur; second sound. P.A.: Systolic murmur; accentuated second sound. Later, a diastolic murmur became audible at the apex, accompanied by thrill.
29	Mary M.	28	Acute rheumatism $2\frac{1}{2}$ years before admission.	III. M.A.: Presystolic, systolic, and diastolic murmurs. Systolic murmur inaudible at back. T.A.: Systolic murmur; second sound accentuated. P.A.: Systolic murmur; second sound accentuated. A.A.: Systolic murmur; second sound.
30	Emma M.	18	Chorea 3 times; first attack set. 12. Admitted with sub-acute rheumatism.	III. M.A.: Presystolic murmur; first $1\frac{1}{2}$ -4 $\frac{1}{2}$ sound; feeble second sound (presystolic thrill). T.A.: First sound; systolic murmur; second sound. P.A.: Systolic murmur; second sound accentuated. Later, note—"There is now a diastolic murmur at the apex, and to the left of the lower part of the sternum. A diastolic murmur can be heard over the sternum as high as the second cartilage." (One day it is noted that this diastolic murmur could not be heard. Another day that at first it could not be heard, but returned later, being accompanied by a reduplicated second sound. When patient was admitted the presystolic murmur was of unusual length, while the second sound could not be heard, and the rhythm of the murmur was somewhat difficult to determine by the ear alone.)
31	Mary M.	46	Acute rheumatism set. 11.	III. M.A.: First sound; systolic murmur; first sound audible at back; diastolic murmur with thrill. T.A.: First sound; slight murmur; second sound. A.A.: First sound; slight murmur; second sound. P.A.: First sound; systolic murmur; second sound. Later, "Marked reduplication of second sound at the apex with systolic and diastolic murmur (the former high-pitched)."
32	Thos. M.	45	Rheumatic fever 15 years before admission.	III. On admission only systolic mitral, $3\frac{1}{2}$ -6 and tricuspid murmurs audible. Murmur not conducted to back. Later, M.A.: First sound; systolic murmur; diastolic murmur. T.A.: First sound; systolic murmur; double second sound. P.A.: First sound; systolic murmur; reduplicated second sound. A.A.: First sound; slight murmur; second sound. Later, loud diastolic murmur (with thrill) at the apex.
33	Eliz. A. M.	26	No rheumatism before attack for which admitted. Scarlatina 4 years before admission.	III. M.A.: Presystolic murmur (at times); $1\frac{1}{2}$ -4 $\frac{1}{2}$ accentuated first sound; diastolic murmur. T.A.: First sound; systolic murmur; second sound. P.A.: Systolic murmur; accentuated second sound. A.A.: Systolic murmur; second sound.

No.	Name.	Age	Antecedents.	Physical Signs.
34	James M.	23	No rheumatism. No chorea.	III. (Presystolic and diastolic thrill at 1-4) M.A.: Presystolic murmur; accentuated first sound; systolic murmur; diastolic murmur. At back both systolic sound and murmur. T.A.: First sound; systolic murmur; second sound. A.A.: First sound; systolic murmur; second sound. P.A.: Systolic murmur; accentuated second sound. Later, a very feeble diastolic murmur down sternum, also to left of sternum below third cartilage. Later, "Reduplication of second sound."
35	Ellen N.	53	Chorea set. 11 (3 attacks). No rheumatism.	III. 1-5 A markedly accentuated first sound, persistent at the apex; pulmonary second sound slightly accentuated. Later, a short presystolic murmur became occasionally audible.
36	Eli N.	23	No acute rheumatism, but 2 years before admission had pain in ankles and feet, for which he attended Manchester Royal Infirmary as out patient.	III. 1-4 M.A.: Presystolic murmur; accentuated first sound; double second sound, and diastolic murmur. Murmurs accompanied by thrills. Diastolic murmur audible up to third cartilage. Later, note—"Diastolic murmur audible over lower half of sternum below third cartilages."
37	Eliz. N.	28	Subacute rheumatism set. 23.	III. 3-8 A.A.: First sound; double second sound. P.A.: First sound; double second sound; diastolic murmur. M.A.: First sound somewhat accentuated; double second sound; slight diastolic murmur. T.A.: First sound; double second sound; diastolic murmur. Later, note—"On patient sitting up first sound becomes much accentuated, and there is at times a little roughness before it."
38	Maria J. N.	43	No rheumatism. No chorea.	III. 3-8 M.A.: Slight presystolic murmur; accentuated first sound; second sound; slight diastolic murmur. T.A.: First sound accentuated; second sound. P.A.: First sound; double second sound. A.A.: First sound; second sound. Later, note—"There is a soft blowing diastolic murmur audible over the lower part of the sternum and to the left of the bone." The first sound in all areas more or less accentuated.
39	Robert P.	41	Rheumatic fever set. 26.	III. 2-5½ Heaving right ventricle impulse; ill-defined apex impulse. M.A.: Slightly accentuated first sound; second sound. T.A.: First sound; loud systolic murmur; second sound. A.A.: First sound; second sound. P.A.: First sound; second sound not quite pure. Occasionally slight systolic murmur at apex.
40	William Jos. P.	54	Rheumatic fever set. 15.	M.A.: Ringing "booming" first sound; systolic murmur; second sound, murmur not audible behind. T.A.: Somewhat accentuated first sound; systolic murmur; second sound. A.A.: First sound; second sound. P.A.: First sound; second sound.

No.	Name.	Age	Antecedents.	Physical Signs.
41	Maria P.	42	No rheumatism. No chorea. Old tubercular dactylitis.	II. 1½-6 M.A.: Systolic murmur; second sound; murmur inaudible behind. T.A.: Systolic murmur; second sound. A.A.: First sound; second sound. P.A.: Systolic murmur; accentuated second sound.
42	Elis. R.	27	No rheumatism. No chorea.	III. 1½-4½ M.A.: Presystolic murmur; accentuated first sound; slight diastolic murmur. T.A.: First sound; reduplicated second sound. A.A.: First sound; second sound. P.A.: First sound; second sound.
43	Mary E. R.	23	No chorea. Admission for rheumatic pains in joints of several weeks' duration.	III. 1-4½ M.A.: Accentuated first sound; systolic murmur not conducted to back. (Presystolic murmur heard day before by R. M. O.) T.A.: First sound; slight murmur; second sound. P.A.: Systolic murmur; accentuated second sound. A.A.: First sound; second sound.
44	Catherine S.	22	Chorea set. 18.	III. 1-4½ M.A.: Presystolic murmur accentuated first sound; systolic murmur; double second sound; diastolic murmur; systolic murmur not audible behind.
45	Henry S.	14	Rheumatic fever 3 years before admission.	II. 1½-4½ (Presystolic thrill at apex.) M.A.: Presystolic murmur accentuated first sound; systolic murmur; no second sound; systolic murmur audible at back plus sound. T.A.: First sound; systolic murmur; accentuated second sound; A.A.: Systolic murmur; second sound. P.A.: Systolic murmur; extremely accentuated second sound; later reduplicate second sound to left of sternum; later double second sound with diastolic murmur at apex.
46	M. J. M. S.	19	Sub-acute rheumatism in knees 3 years before admission. Had not to stay in bed. Off work for a week.	III. 1½-4½ M.A.: First sound; systolic murmur; second sound; first sound audible at back. T.A.: First sound; systolic murmur; second sound. A.A.: First sound; systolic murmur; second sound. P.A.: First sound; systolic murmur; second sound. Later, a loud rather shrill diastolic murmur was heard in the left second and third interspaces, with maximum intensity about an inch from the sternal border. Second sound greatly accentuated in pulmonary area. The area over which the diastolic murmur was heard was carefully defined, its boundary to the right (middle line) was the left sternal border. Above, the second rib; below, the fourth rib. The left boundary was situated somewhat externally to the nipple line.
47	Ellen S.	18	Rheumatic fever set. 10 and 12.	III. 1-8½ (Presystolic and diastolic thrills at apex.) M.A.: Presystolic murmur accentuated first sound; diastolic murmur; systolic sound at back. T.A.: Systolic murmur; second sound; slight diastolic murmur. A.A.: First sound; second sound; diastolic murmur. P.A.: First sound accentuated; diastolic murmur. Later, note "Diastolic murmur heard at top of sternum."

No.	Name.	Age	Antecedents.	Physical Signs.
48	Eliz. S.	27	No rheumatism. No chorea. Scarlet fever set. 8.	Huge area of dulness. Effusion? On admission: Slight systolic mitral and tricuspid murmurs, not replacing first sound. Day after admission, sharp loud first sound at apex; urine loaded with albumen; granular and hyaline casts.
49	Catherine T.	36	Rheumatic fever set. 14 or 15.	III. M.A.: Loud systolic murmur; second sound; both systolic sound and murmur at back. T.A.: Systolic murmur; second sound. A.A.: Systolic murmur; second sound. P.A.: Systolic murmur; second sound. Later, at sternal extremities of 3rd and 4th left spaces a slight diastolic blowing murmur. Later, "soft blowing diastolic murmur down sternum and to the left of lower part of bone." Later, systolic murmur almost inaudible behind (at angle of scapula). First sound distinct.
50	Margaret W.	22	No rheumatism. No chorea.	III. 1-4 (Presystolic thrill at apex). M.A.: Presystolic murmur; accentuated first sound; no second sound; presystolic murmur audible to right edge of sternum. T.A.: Presystolic murmur; accentuated first sound; second sound. P.A.: Accentuated first sound; second sound; slight diastolic murmur. A.A.: First sound; second sound; not quite pure. Later, presystolic murmur can be heard in pulmonary area. Later, well-marked soft blowing diastolic murmur down sternum. Later, presystolic murmur widely conducted, for instance, is heard over the lower part of the sternum and up to third left cartilage, as before noted.
51	Philip W.	46	Rheumatic fever set. 16. 10 years before admission was in Manchester Royal Infirmary for acute pneumonia.	III. 1½-5 M.A.: Accentuated first sound; second sound; occasional high-pitched systolic murmur; first sound audible at back. T.A.: First sound; second sound. P.A.: First sound; second sound. A.A.: First sound weak; second sound. Later systolic murmur and slight diastolic murmur, with double second sound at apex. On readmission, systolic murmur over mitral and tricuspid areas; first sound audible at back.
52	Michael W.	37	Rheumatic fever set. 25.	IV. 1½-5 M.A.: Presystolic murmur; accentuated first sound; double second sound; diastolic murmur. T.A.: First sound; prolonged blowing high-pitched murmur; diastolic murmur. A.A.: First sound; diastolic murmur; loud and blowing. P.A.: First sound; accentuated second sound; diastolic murmur.
53	Thos. H.	25	No rheumatism. No chorea.	III. 1½-4 M.A.: Loud harsh systolic murmur, accompanied by thrill feeble diastolic murmur; systolic murmur audible at back. T.A.: Systolic murmur; double second sound. P.A.: Systolic murmur; accentuated second sound. A.A.: Systolic murmur; double second sound. Later note that first sound was audible at back plus murmur, but latter feeble.

No.	Name.	Age	Antecedents.	Physical Signs.
54	Sarah W.	23	No rheumatism. No chorea.	M.A.: Abrupt first sound; double second sound; loud diastolic murmur. T.A.: First sound, systolic murmur; double second sound. A.A.: First sound; double second sound. P.A.: First sound; systolic murmur; double second sound; short diastolic murmur. Later note—at the sternal extremity of third intercostal space a diastolic murmur is distinctly audible. The second sound is double at this spot and its neighbourhood. Later, at apex, presystolic murmur; double second sound; diastolic murmur (presystolic thrill at apex.) Later, "fine blowing diastolic murmur down sternum."
55	Eliz. W.	39	No rheumatism. No chorea.	III. 1½-4½ M.A.: Thumping first sound; diastolic murmur. T.A.: First sound; systolic murmur; diastolic murmur. A.A.: First sound; systolic murmur; second sound; diastolic murmur. P.A.: First sound rather thumping and not quite pure; reduplicated second sound; diastolic murmur. (Later, slight diastolic thrill at apex.)
56	James W.	16	Acute rheumatism set. 8, and several attacks later.	III. 1½-6½ (Well-defined vigorous apex-beat in sixth space; exaggerated epigastric impulse; diastolic "purring" thrill over apex.) M.A.: Systolic and diastolic murmur; systolic murmur audible at back. T.A.: Systolic murmur; second sound. A.A.: Systolic murmur; weak second sound. P.A.: Systolic murmur; accentuated second sound. Later, at apex presystolic murmur; accentuated first sound; double second sound; diastolic murmur. (Presystolic thrill at apex.)
57	Grace J.	24	Rheumatic fever, set. 14 and later.	II. 2-4½ M.A.: Presystolic murmur; accentuated first sound; double second sound and diastolic murmur. T.A.: First sound; double second sound. P.A.: First sound; accentuation and reduplication of second sound. A.A.: First sound; second sound. Later, musical diastolic murmur; murmur with double second sound audible over the sternum as high as second costal cartilages and to the left of the bone. Later, systolic murmur at apex audible at back.
58	Clara A.	31	Rheumatic fever set. 16.	III. 1½-4½ M.A.: Presystolic murmur; first sound; high pitched systolic murmur; double second sound; diastolic murmur; first sound audible at back. T.A.: Accentuated first sound; double second sound; diastolic murmur. P.A.: Accentuated first sound; double second sound; diastolic murmur. A.A.: Accentuated first sound; double second sound; diastolic murmur. Later, diastolic murmur very distinct at apex and lower part of sternum. (Patient has an arched sternum.) The diastolic murmur is audible up to the second cartilage, but is much less distinct there than below. The murmur can be heard even over the manubrium sterni and to the left almost the length of the bone.

No.	Name.	Age	Antecedents.	Physical Signs.
59	Mary D.	30	Rheumatic fever 12 years before admission, repeated attacks since that time.	II. M.A.: Sharp first sound; systolic murmur; second sound; first sound audible at back. T.A.: First sound; systolic murmur; accentuated second sound. A.A.: First sound; second sound. P.A.: First sound; systolic murmur; accentuated second sound. Later, double second sound and diastolic murmur at apex. Later, short presystolic murmur as well as diastolic murmur at the apex. The first sound is accentuated and the second sound double.
60	Edith F.	25	Rheumatic fever est. 10 and 20.	III. M.A.: (Presystolic murmur on admission); first sound; slight systolic murmur; second sound; first sound pure at back. T.A.: First sound; slight systolic murmur; second sound. P.A.: First sound; systolic murmur; second sound. A.A.: First sound; systolic murmur; second sound; slight diastolic murmur. Later, diastolic murmur loud over the sternal extremity of second left interspace where there is pulsation. Later, the diastolic murmur audible over the sternum at the level of the second and third cartilages. Later, diastolic murmur audible over the manubrium sterni and the upper part of the bone. Later, double second sound to the left of the sternum, well marked.

POST-MORTEM NOTES.

Case 3.—Considerable quantity of effusion in pericardial sac. Heart weighs 19oz., and is much dilated, especially right side. Tricuspid orifice admits four fingers, cusps slightly thickened at edges. Pulmonary valves normal. Left auricle considerably dilated, and walls much thickened. Mitral orifice stenosed, admits tip of thumb. No recent vegetations. When viewed from ventricle, flaps are seen to be drawn ventricle-wards, and chordæ tendinæ are much shortened and thickened, particularly at points of attachment to borders of valve-curtains. Kidneys slightly diminished in size. Capsule peels off with slight difficulty. Surface rather irregular and granular. Right kidney presents some cysts. Cortex somewhat diminished. Substance feels firm and rigid.

Case 4.—Heart weighs 14oz., slightly enlarged. Mitral valves sclerosed, and orifice markedly sclerosed, scarcely admitting a small little finger. Aortic valves sclerosed, puckered; in parts calcified. Tricuspid segments are slightly indurated. Numerous infarcts in kidneys.

Case 8.—Some fluid in pericardium. Heart enlarged: weighs 11lb. 3oz. Right auricle and ventricle dilated and somewhat hypertrophied. Left auricle hypertrophied and dilated. Mitral valves extremely sclerosed, and aortic flap calcified; orifice admits only little finger. Left ventricle dilated. Aortic valves showed several fine vegetations.

Case 10.—Some hydropericardium. Heart-muscle enlarged : weight, 14oz. ; right auricle distended with white and black blood-clot. Tricuspid orifice admits four fingers. Right ventricle dilated and walls much hypertrophied. Pulmonary valves normal. Left ventricle dilated and hypertrophied. Mitral orifice markedly stenosed, barely admitting tip of little finger, funnel-shaped type, two flaps of mitral valve drawn downwards towards left ventricle and fixed, so that auriculo-ventricular communication exists only through a small elliptical opening. Edges of orifice thick and rigid, with calcareous deposition and roughened. Particles of fibrin adhere to roughened edges. A large fibrinous tag hangs down into ventricle. Left ventricle dilated and hypertrophied. Aortic valves slightly sclerosed and fenestrated, but afford no evidence of incompetence. Commencing atheroma just above valves. Brain : Extensive softening in region supplied by middle cerebral artery.

• *Case 11.*—Slight increase of pericardial fluid ; heart much enlarged. Right auricle dilated ; walls slightly thickened ; tricuspid orifice admits four fingers. Right ventricle enlarged ; walls thickened ; pulmonary artery normal. Left auricle dilated ; wall thickened. Mitral orifice distinctly stenosed ; admits ring and little finger. Valve segments much sclerosed, somewhat puckered, and extensively infiltrated with calcareous salts ; orifice, viewed from above, somewhat button-shaped, or more correctly, semi-cruciform ; viewed from ventricle, the appearance is somewhat that of a funnel. Left ventricle enlarged ; wall slightly hypertrophied. Aortic segments much thickened, slightly puckered, and evidently have allowed of a certain amount of regurgitation. No recent vegetations. Kidneys : Capsules peel readily ; surface granular, infarcts, cortex diminished.

Case 12.—Pericardium can be seen projecting downwards to tip of xipho-sternum. No increase of fluid. Heart weighed 1lb. 6oz. Infundibulum is dilated with right side of heart, while the left auricle, with its appendix, lies well to the back, and out of sight. Right auricle exceedingly dilated and somewhat hypertrophied. Appendix blocked with clot. No endocarditis of tricuspid valves. Tricuspid orifice admits four fingers. Right ventricle extremely hypertrophied. Pulmonary orifice large, otherwise normal. Left auricle hypertrophied and dilated. Appendix blocked with firm coagulum. Mitral orifice admits but tip of little finger. Left ventricle dilated and somewhat hypertrophied. Aortic orifice and valves normal. Pulmonary, renal, and splenic infarcts.

Case 16.—Pericardium : Early pericarditis, most marked round roots of large vessels. Heart enlarged ; 15oz. ; considerable subpericardial infiltration of fat. Right auricle hypertrophied and dilated. Tricuspid orifice admits four fingers. Right ventricle hypertrophied and dilated.

Pulmonary valves normal. Left auricle hypertrophied and much dilated. Mitral orifice distinctly stenosed, admits thumb up to base of nail. Valve flaps much thickened, firm and tough. No recent endocarditis. The valve aperture, though somewhat button-holed or diaphragm-shaped when viewed from above, is, nevertheless, particularly as regards its anterior flap, tending to a funnel shape. Left ventricle dilated, aortic valves healthy and competent. Aorta atheromatous and dilated. Pulmonary infarcts. Liver enlarged and congested. Spleen normal in size, infarcts. Kidneys healthy.

Case 18.—Pericardium very markedly enlarged, extending upwards to lower border of manubrium sterni, and bulging laterally on each side towards pleura; its anterior surface adherent to sternum. Pericardium contains $12\frac{1}{2}$ oz. fluid. Heart weighs 14 oz., much enlarged. Right auricle and right ventricle form great part of heart seen on exposure. Left auricle does not appear, and only a limited strip of left ventricle comes to the front. Apex formed by both ventricles, but mainly by right ventricle. Right auricle dilated and hypertrophied, contains much dark and light clot. Tricuspid orifice admits four fingers. No valvulitis. Right ventricle dilated, and considerably hypertrophied. Pulmonary orifice and valves normal. Left auricle dilated and markedly hypertrophied. Mitral orifice admits tip of two small fingers. Chordæ tendineæ shortened, thickened, and in part fused, thus preventing approximation of valves. Left ventricle enlarged, dilated, but not markedly hypertrophied. Aorta and valves normal.

Case 22.—The pericardium generally adherent. At upper and posterior parts lymph evidently of very recent date. Heart weight $12\frac{1}{2}$ oz. Tricuspid orifice admits two fingers. Valve segments thickened. Pulmonary orifice healthy. Mitral orifice extremely stenosed, admitting only tip of middle finger. Valve segments sclerosed, with a considerable amount of calcification. Chordæ tendineæ shortened and thickened. Valve segments of aorta considerably thickened by chronic endocarditis. No distinct stenosis was detected. Apparently there was but little obstruction, and but little regurgitation. The valve segments were the seat of a recent vegetative endocarditis. Kidneys had general appearance of extensive fibrosis. Left kidney had several cysts containing fluid, and granules of the nature of gravel.

Case 24.—Patient died ultimately outside hospital, and post mortem showed mitral stenosis.

Case 26.—Pericardium: Increased fluid, milk spot. Both left and right sides of heart enlarged; clots and fluid blood in cavities. The right auriculo-ventricular orifice dilated, admits four finger-tips. Left

auriculo-ventricular orifice stenosed ; admits merely point of middle finger. Right auricle dilated. Tricuspid orifice dilated ; valve segments indurated, but no vegetations. Right ventricle dilated, and walls slightly hypertrophied. Pulmonary artery : Orifice normal ; valves healthy. Left auricle dilated, and wall thickened. Mitral segments both markedly indurated, and the seat of extensive calcareous deposition, producing a rigid and somewhat button-holed stenotic orifice. No recent vegetation. Chordæ tendinæ indurated and shortened. Left ventricle dilated, but walls only slightly hypertrophied. Aortic valves healthy. Aorta healthy.

Case 28.—Pericardium : Slight increase of fluid. Heart much enlarged, prominent infundibulum. Left auricle lies out of sight. Right auricle hypertrophied and much dilated. Tricuspid orifice dilated, valves thickened. Right ventricle much dilated, and walls extremely hypertrophied. Pulmonary orifice enlarged. Left auricle much dilated and greatly hypertrophied. Mitral orifice contracted to mere button-hole-like slit scarcely admitting tip of forefinger. The mitral orifice and valve segments converted into hard, rigid calcified ring. When removed from ventricle valve segments are seen to be somewhat drawn ventriclewards into a somewhat funnel-shaped rigid structure. Cordæ tendinæ short and thickened. Left ventricle dilated, but not hypertrophied. Aortic valves normal. Coronary orifices patent. Aorta normal.

Case 32.—Pericardium adherent all over heart. Numerous small hæmorrhagic spots beneath visceral pericardium. Heart enlarged. Weight, 1lb. 4½oz. Right auricle dilated and somewhat hypertrophied. Right ventricle dilated and hypertrophied. Tricuspid orifice admits tips of all the fingers ; valves normal. Pulmonary orifice and valves normal. Left auricle somewhat dilated. Mitral orifice admits one finger ; valves show endocarditis, thickened, puckered, and irregular, and present a great deal of calcification. Left ventricle dilated ; walls very much hypertrophied. Aortic valves somewhat thickened, but no distinct endocarditic deposit.

Case 39.—Pericardium adherent. Heart much enlarged. All cavities extremely dilated. Mitral stenosis. Fairly recent vegetative endocarditis of aortic and tricuspid valves. Aortic valves thickened and somewhat puckered from old endocarditis.

Case 40.—Pericardium : slight external adhesion to chest wall towards left. Heart enlarged. All cavities dilated. Mitral orifice stenosed, somewhat button-holed in shape. Segments, specially "aortic," rigid from calcareous deposition. Aortic valves healthy. Myocardium friable.

Case 41.—Pericardium contains straw-coloured effusion. Heart enlarged ; right side distended ; left auricle invisible, and only

a small portion of left ventricle comes into view at the apex. Right auricle dilated. Triuspid orifice admits four fingers and thumb. Right ventricle much dilated, but little hypertrophied. Pulmonary orifice normal. Left auricle dilated and considerably hypertrophied. Mitral orifice stenosed, admitting only two small fingers. The stenosis is of button-hole variety. Slight vegetations along border of valves. Chordæ tendineæ much shortened and fused together; the upper part of the papillary muscle, from which many of them arise, fibrous, and of almost cartilaginous consistence. Left ventricle dilated and slightly hypertrophied. Aortic valves sclerosed and slightly incompetent to water test. A little above the aortic valve is a distinct patch of recent adherent fibrin. Kidneys, "distinct renal fibrosis."

Case 48.—Pericardium distended, with considerable quantity of amber-coloured fluid. Heart much enlarged. Right auricle dilated. Triuspid orifice dilated. No valvulitis. Right ventricle much dilated and considerably hypertrophied; infundibulum very prominent. Left auricle dilated and hypertrophied. Mitral orifice admits tip of middle finger, is markedly stenosed, somewhat funnel-shaped; edges of valves hard and rigid. Left ventricle dilated, not markedly hypertrophied. Aortic cusps distinctly thickened.

TABLE PUBLISHED IN 1888.

A.—MODIFICATIONS OF THE NATURAL HEART-SOUNDS IN MITRAL STENOSIS.	B.—MURMURS.
1.— <i>Accentuation of the 2nd sound in the pulmonary area.</i> 2.— <i>Accentuation of the 1st sound in the mitral area.</i> 3.— <i>Reduplication of the 2nd sound.</i> 4.— <i>Absence of the 2nd sound in mitral area.</i>	1.— <i>Presystolic murmur in the mitral area.</i> 2.— <i>Diastolic murmur in the mitral area, etc.</i> 3.— <i>Systolic murmur in the mitral area.</i> 4.— <i>Systolic murmur over the left auricular appendix?</i> 5.— <i>Systolic murmur in tricuspid area.</i>

(In no case was there *persistent* absence of murmur. In Case 12 no murmur was audible on admission, although next day a systolic murmur of extraordinary loudness became audible. In Case 48, again, murmur was often absent, and in Case 35 generally so, though in both the first sound was more or less accentuated.)

A.—Modifications of the natural heart sounds: (1) The first auscultatory sign of mitral stenosis in the foregoing table is one common not only to all cardiac lesions, as soon as they disturb the circulation, but to all

lung conditions, as soon as they interfere with the due oxygenation of the blood; and finally, to blood conditions, especially anæmia, which have a like effect. I will take advantage of my having placed the sign in italics in the table, thereby emphasising the fact that the sign is not to be regarded as characteristic of mitral stenosis, in order to exclude it from consideration here. Holding the views which I do with regard to the sign, and which I have expressed in my former communication,* I have not sufficiently attended to the precise characters of the second sound in the pulmonary area to make my records with regard to them of any value.

A 2.—The next modification of the physiological heart-sounds has, on the contrary, been carefully recorded, and it will form the subject of our first statistical enquiry. Here the sign will be referred to only when presystolic murmur is absent, for the presystolic murmur is practically always associated with a first sound so modified. In 8 cases, or 13·33 per cent, an accentuated first sound is recorded without a presystolic murmur having ever been heard. In 7 of the 8 cases, on the other hand, an apex-systolic murmur was present at one time or another, and in the remaining (8th) case, an apex-diastolic murmur and thrill accompanied the modified first sound. Of the 7 cases with systolic murmur, the latter was "temporary" in 4, and in 1 was noted as "slight."

A 3.—The third modification of a cardiac sound in the table is reduplication of the second sound, which was present in 39 of the 60 cases, or 65 per cent.

A 4.—The second sound was absent in the mitral area (apex) in 7 cases, or in 11·66 per cent. Of these, in 3 there was no diastolic murmur anywhere present; in 1 there was a diastolic murmur both at the apex and above the apex; in 2, diastolic murmur was present at the apex and absent above the apex; and in 1, diastolic murmur was absent at the apex and present above (aortic?).

To sum up—

A 2—Present in 13·33 per cent, without presystolic murmur.

 " " 53·33 " with presystolic murmur.

 " " 66·66 per cent.

A 3—Present in 65 "

A 4—Present in 11·66 "

These figures bear out the belief that accentuation of the first sound in the mitral area and reduplication of the second sound are common signs

* MEDICAL CHRONICLE, May, 1888.

in cases of mitral stenosis, and that absence of the second sound from the mitral area is comparatively rare.

Passing on to the consideration of murmurs:—

B 1.—In 32 of the 60 cases, or in 53·33 per cent, a presystolic murmur was present. Thus in more than half.

B 2.—Diastolic murmur in the mitral area or elsewhere, was present in 48 of the 60 cases, or 80 per cent. It was present at the apex only in 18, or 30 per cent. It was present above the apex only in 8, or 13·3 per cent, and present at both apex and above in 22 or 36·66 per cent.

Thus :

Diastolic murmur at the apex only in 30·00 per cent.

“ “ above apex only in 13·33 “

“ “ at apex and above 36·66 “

In four-fifths of the cases, then, a diastolic murmur was audible over the heart in one or other area. In 66·6 per cent diastolic murmur was present at the apex. In 30 per cent the murmur was limited to the apex, and in 36·6 per cent a murmur of similar rhythm was heard above the apex as well as at the apex itself. It is more common, therefore, to hear a diastolic murmur both at apex and above than at the apex only.

Of the eight cases in which the diastolic murmur was present above the apex only, the murmur was probably aortic (incompetence) in Cases 11, 19, 22, 39, 49, 50, and 60, while in Case 46 there is some ground for the belief that the murmur represented the “murmur of high pressure in the pulmonary area,” which I have described in the pages of this Journal (December, 1888). I have dwelt in the same communication upon the great difficulty of excluding the possibility of there being aortic incompetence in cases of the kind referred to.* It will be seen by the post-mortem records that in half the cases the aortic valves showed some change, although often trivial.

B 3.—In 45 of the 60 cases, or 75 per cent, a systolic murmur was present in the mitral area—the apex. In 28 cases, or 46·66 per cent, this murmur was inaudible at the back, being there replaced by the first sound, and in 17, or 28·33 per cent, the murmur was audible at the back.

Systolic murmur absent from mitral area ... in 15 cases, or 25 per cent.

Systolic murmur present at apex, but in-
audible at the back in 28 “ or 46·66 “

Systolic murmur present at the apex and at
the back in 17 “ or 28·33 “

Thus, while these statistics bear out the belief that non-conduction of the apex systolic murmur to the back, the murmur becoming replaced

* In case 18 there was post-mortem evidence of the absence of aortic disease, although “to the left of the sternum (there was) a loud diastolic murmur, which had its maximum intensity in the second and third spaces.”

by the first sound, occurs in the majority of cases of mitral stenosis, the exceptions form a considerable minority. Of the 17 cases in which the systolic murmur in the mitral area was conducted to the back, in 10 the first sound was present at both apex and back, in four at the back only, and in one at the apex only. The first sound was absent from both apex and back in only two cases.

B 4.—53 cases available.

As it has been proved that the pulsating area occasionally seen above the third costal cartilage represents not the left auricle, but the infundibulum of the right ventricle, which pushes aside, as it were, the left auricle, the mark of interrogation placed after this sign in the table is more than justified. Nevertheless, it will be of interest to enquire how frequently a systolic murmur is met with in the "pulmonary" area.

In the pulmonary area—sternal extremity of the third left cartilage :

The first sound alone present in.....	9, or 16·981 per cent.
First sound and systolic murmur in	27, or 50·943 ,,
Systolic murmur alone in	17, or 32·075 ,,

Thus in 83·018 per cent of the cases a systolic murmur was present in the pulmonary area, a result which accords with common experience of the frequency of systolic murmur in this situation, not only in cases of mitral stenosis, but in cardiac cases in general.

B 5.—53 cases available. With regard to the tricuspid area I may be brief :—

The first sound was alone present in.....	17 cases, or 32·075 per cent.
Systolic sound and systolic murmur together in 14 ,,	or 26·415 ,,
Systolic murmur alone in.....	22 ,, or 41·509 ,,

Thus systolic (regurgitation) murmur was present over the tricuspid area in 67·924 per cent of the cases. No case on the list presented a tricuspid presystolic murmur* or tricuspid stenosis on post mortem. When tricuspid stenosis exists, a much higher degree of mitral stenosis is usually associated with it.

Of the 60 cases, in 40 or 66·66 per cent there was evidence of a rheumatic origin, although it is noteworthy that in three cases (2, 20, and 33) the patient came in with evidence of mitral stenosis while suffering from an alleged first attack of rheumatism. I have had a like experience in cases in which there was evidence of old mitral disease, though not of stenosis. For instance, a boy came into hospital with an enlarged heart and mitral regurgitation, suffering from his alleged first attack of rheumatism, which had begun a few days before admission. These facts are significant, and point to the proportion of

* Case 50 may be regarded as an example, but the unusual conduction of the mitral murmur has to be borne in mind.

cases in which rheumatism is the active factor in the production of the lesion being greater than the figures given indicate. Subacute rheumatism is no doubt often forgotten, or the history of it in early life is often that of "growing pains," which did not prevent the child moving about. In 6 cases, or 10 per cent, there was a history of chorea without rheumatism. One of the rheumatic patients had also suffered from chorea. (The association of the two diseases is, I think, more frequent than my figures indicate.) In 14 of the 60 cases, or 23·33 per cent, there was no history of rheumatism or chorea. Thus:—

Rheumatic cases	66·666 per cent.
Choreic cases	10·000 "
Cases without history of either rheumatism or chorea	23·333 "

In Cases 19, 33, and 48 an attack of scarlatina is noted in the history of the patient. In Case 19 it is stated that the rheumatism occurred after the scarlatina, and that the patient had been since subject to subacute rheumatism. In Case 33, while the patient came in with rheumatism, she gave no history of a previous attack, but had had scarlatina four years before. It has to be remembered, however, that, as a girl, shortness of breath had been noticed. In Case 48, while there had been neither rheumatism nor chorea, scarlatina had occurred at the age of eight. There are no doubt several distinct joint affections met with in cases of scarlatina, and while I hold that the most characteristic (the mild affection occurring at the end of the first week), is not truly rheumatic, I do think scarlatina has the power of calling out, as it were, a perhaps hitherto latent tendency to true rheumatism. Only one of the 60 cases supports the belief that scarlatina is ever responsible for the endocarditic changes which eventuate in mitral stenosis, and, to my mind, the evidence is by no means conclusive. My figures show that in 23·33 per cent a history of neither rheumatism nor chorea could be obtained. Making allowance for the fact that rheumatic manifestations are often misinterpreted in childhood, the proportion remains a large one.

Of the 60 cases 41 were female and 19 male. The average female age was 31·58 years. The average male age, 28·421 years.

The distribution of the cases, as regards age and sex, was as follows:—

Age.	M.	F.	Total.	Per cent.
From 10 to 19	4	4	8	13·33
" 20 , 29	9	16	25	41·66
" 30 , 39	1	10	11	18·33
" 40 , 49	4	8	12	20·00
" 50 , 59	1	3	4	6·66
Totals	19	41	60	

The 18 fatal cases, as regards age and sex, were distributed as follows:—

	M.	F.	Total.
From 10 to 19	0	0	0
„ 20 „ 29	3	3	6
„ 30 „ 39	0	1	1
„ 40 „ 49	4	5	9
„ 50 „ 59	1	1	2
Totals.....	8	10	18

This shows, of course, a greater mortality among the males—nearly twice as great—but the fatal ages are similar in both sexes. Supposing the lesion in the majority of instances to be produced in at least the adolescent period, is it the commencement of senile degenerations which makes the fifth decade so fatal to the survivors with mitral stenosis? Those who struggle through the third decade would seem to have a presumption of survivorship to the fifth. The figures are perhaps too small for much importance to be attached to these results, but they are worthy of a note in passing.

A curious feature of cases of mitral stenosis is the presence of circumscribed flushes on the cheeks. So frequent did the condition seem to be that I thought it worth noting, and although in the earlier cases I cannot vouch for its being always noted when present, the feature comes out in the 60 cases under consideration no fewer than 19 times, or in 31·66 per cent of the cases—one may say in a third of the cases.

The last clinical feature of mitral stenosis that I shall remark upon is the size of the heart, which, as clinically determined, I have noted in 55 cases. I have already, in the pages of this Journal, described the method of percussing the heart I adopt, and here I have only to remind the reader that the Roman figure above indicates the costal cartilage to which the upper margin of the heart extends (as determined in a vertical line drawn down an inch to the left of the sternum). If the heart extends unduly upwards here, the infundibulum of the right ventricle, and not the left auricle, as used to be supposed, is the extended portion of the heart. The Arabic figure to the reader's left again, indicates, in inches, the greatest extension of cardiac dulness to the right of the middle line, immediately above the liver dulness, and indicates, therefore, the size of the right auricle—a readily distended chamber, the size of which gives a useful means for gauging the amount of obstruction in the pulmonary circulation, in the circulation thus immediately behind the lesion. Lastly, to the reader's right, we have the Arabic figure representing, in inches, the greatest extension of cardiac dulness to the left, therefore the size of the left ventricle, the

apex of which must be, from the position of the heart, the part extending most to the left. An approximate estimation is all that is aimed at.

In my 55 cases available for studying the results of percussion, the smallest measurement recorded is $\frac{III.}{2}-3$ (Case 38) and the maximum

$\frac{III.}{2}-6$ (Case 10). A specially interesting measurement is that in Case 3

$\frac{II.}{4}-5\frac{1}{2}$ indicating enormous dilatation of the right side of the heart, the form of dilatation which may naturally be supposed to follow the lesion with special prominence. From the figures obtained in the 55 cases, I have struck an average so as to endeavour to get the ideal size of the heart in cases of the lesion. The size of such ideal heart would be accordingly:— $\frac{III.}{1\frac{1}{2}}-4\frac{4}{5}$. *

The right auricle we should expect to be large, but the left ventricle is larger than might be expected from purely theoretical considerations, although, I think, it accords with the general impression one receives from daily practice.

In 9 of the 55 cases, or 16·3636 per cent, the cardiac dulness extended to the second left cartilage. Granting that extension of cardiac dulness upwards is due to expansion of the infundibulum of the right ventricle, this result is not surprising. (Of course pericardial effusion is supposed to be out of the question.)

The effect of pericardial adhesion upon the heart {muscle (however the result is brought about) in inducing dilatation of the chambers must be borne in mind, and especially so in young patients. With reference to these latter, I take this opportunity of saying that such patients are, probably, not fairly represented in my cases, which are all drawn from the Manchester Royal Infirmary, an institution into which comparatively few young medical patients are admitted, no doubt for the excellent reason that such are amply provided for by special institutions outside (the Pendlebury and the Clinical Hospitals).

REMARKS ON AUSCULTATORY SIGNS.

The modifications of the heart sounds and murmurs noted in my table in 1888 as characteristic of mitral stenosis are well represented in the 60 cases:—

Accentuation of first sound in mitral area	in 66·66 per cent.
Reduplication of second sound.....	in 65 per cent.
Absence of second sound from mitral area	in 11·66 per cent.

* $R = 1·4227 = 1\frac{1}{2}$; $L = 4·818 = 4\frac{4}{5}$ inch.

Presystolic murmur.....	in 53·33 per cent.
Systolic murmur at apex ..	} in 75 per cent ; inaud. at back, 46·66 per cent ; aud. at back, 28·33 per cent.
Diastolic murmur at apex and above	in 66·66 per cent.
Diastolic murmur above apex only	in 13·33 per cent.
Systolic murmur about "pulmonary area".....	in 83 per cent.
	(53 cases available.)
Systolic murmur in tricuspid area	in 67·924 per cent.
	(53 cases available.)

Accentuation of the first sound at the apex and reduplication of the second sound stand thus in the same rank as signs of the lesion, while absence of the second sound from the apex occurs with sufficient frequency to make it a noteworthy sign of the disease.

With regard to murmurs in the mitral area, as might have been expected, the systolic is found to be the most frequent (75 per cent).^{*} Next to it comes, not the presystolic but the diastolic murmur (66·66 per cent), while the presystolic comes last of all (53·33). It is curious to note that, as regards diagnostic value, the three murmurs would stand in reversed order, the presystolic being the most characteristic murmur, the systolic the least, the diastolic interposed. The conduction of the systolic murmur accompanying mitral stenosis to the back appears to be more frequent than I believed in 1888 ; but such conduction takes place still in a minority of cases—28·33 per cent, non-conduction being met with in 46·66 per cent.

It is the diastolic murmur, however, which seems to call for most attention ; and I am glad that in my table I added "etc." after "mitral area," which enables me to consider diastolic murmurs heard elsewhere than at the apex. The frequency of diastolic murmur in one area or another in cases of mitral stenosis is very remarkable (80 per cent), and if we exclude from consideration those diastolic murmurs inaudible at the apex we still have a percentage of 66·66 per cent. I must confess that I am far from satisfied with my knowledge of this murmur. It is easy to say that there is aortic incompetence as well as mitral stenosis in many such cases ; but it must be admitted that the clinical evidence of the former condition is often sadly deficient.

Now that I have learned to look for a diastolic murmur *above* the apex in every case of mitral stenosis, the frequency of such a murmur seems

^{*} I have had to exclude a large number of cases (which I believe to be cases of mitral stenosis) with a simple systolic murmur at the apex, replaced by the 1st sound at the back, and a history of acute rheumatism years before, because I did not consider the evidence of stenosis in such cases conclusive. Cases of the kind included in the list have proved fatal, and the diagnosis has been placed beyond doubt.

to be very great indeed. Often I do not hear it when the patient first comes into hospital, though later it is plain enough. A great deal has been written on the auscultatory signs of mitral stenosis, and there can be no doubt that when the more attractive and characteristic presystolic murmur was first described, the diastolic murmur became, as it were, pushed aside and neglected. Statistics show that it is the more frequent murmur of the two in mitral stenosis. That it has less diagnostic value I freely admit, for not only does a diastolic murmur accompany aortic disease as well as mitral disease, but it occurs in rare cases of simple dilatation of the heart without either valve-lesion. I have related my experience of two such cases in the *Practitioner*, and that experience, perhaps, has helped to lead me to the somewhat heterodox belief that our knowledge of even the murmurs of mitral stenosis is far from being complete. It is well in clinical medicine to be reminded at times of the words of J. J. Rousseau :—"Je sais que la vérité est dans les choses et non dans mon esprit qui les juge, et que moins je mets du mien dans les jugements que j'en porte, plus je suis sûr d'approcher de la vérité."

THE PULSE.

I have already trespassed so much upon the indulgence of the Editors (and, I may add, of the reader), that I must be brief with the consideration of the pulse. Few subjects in clinical medicine have been debated more warmly than the pulse in mitral stenosis, some authors contending that the prevailing pulse is characterised by irregularity ; others, that it is perfectly regular. The matter is one of fact and observation, and not of opinion. The accompanying sphygmograms illustrate the variations of pulse met with not only in different cases but in the same case at different times and in different circumstances.

I sum up my belief with regard to the matter in the following statements :—

(1) In healthy individuals the pulse varies : some have a normal pulse-tension fairly "high ;" others, a normal pulse-tension fairly "low." In mitral stenosis, this physiological individual difference must not be lost sight of.

(2) It would appear that most cases of the lesion pass through three stages : (a) A stage in which auscultatory signs (presystolic murmur, etc.) are best developed, while symptoms of disturbed circulation are feebly developed or absent, and in which the pulse is regular and of high tension, showing a well-developed tidal wave. There is, of course, nothing characteristic of the lesion in such a pulse. (b) A stage in which symptoms of disturbed circulation are more or less pronounced, and which is accompanied by an irregular pulse of the kind indicated as



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Case 53.—Low tension (third stage).

Case 54.—High tension (first stage).

Case 55.—Peculiar type of tracing characterised by well developed tidal wave but very low aortic notch (Vid. case 19).

Case 56.—Typical (second stage).

Case 57.—Typical (second stage).

Case 58.—High tension (first stage).

Case 59.—Typical (second stage).

Case 60.—Tension rather low; slight development of tidal wave but dirotic notch low.

"typical" in the accompanying illustrations. Such a tracing shows a series of low tension ill-developed curves, interrupted from time to time by a curve of fairly good tension, with tidal wave developed, or a series of good tension curves may be interrupted by an occasional low tension and ill-developed curve. That is to say, one or other curve may predominate. A similar tracing is met with in simple muscle failure of the heart. It is not pathognomonic. Many patients die in this stage. (c) The pulse of the second stage becomes one of low tension, and may be regular or irregular as regards the height of the upstrokes of the tracing, etc.; more often, I think, the former. In many cases this stage is never reached, the patient dying in the second stage. On the other hand, the third stage is often reached and recovered from, stage 2 and even stage 1 being resumed. A low tension pulse (third stage) is often temporarily assumed from a variety of causes (pyrexia, etc.). I believe few patients die with a first stage pulse, except from complication. Physiological low-tension must be borne in mind in estimating the prognosis. I fancy certain patients have low-tension pulses from first to last. The three stages to which I have referred are mere generalisations. It must not be supposed that exceptions are infrequent.

(3) The bigeminal pulse is frequently met with in mitral stenosis, but is also common in simple "muscle" cases. In aortic incompetence even it is by no means rare. It should not be associated with any one lesion, and digitalis is commonly a factor in its production.

(4) No pulse is pathognomonic of mitral stenosis. Each type of pulse met with, is also met with in other diseases. A patient with mitral stenosis may show, at different times and under different circumstances, extremely high tension (especially under the influence of digitalis), and extremely low tension. In the stage which I have described as the second stage the pulse tracing may be regarded as a combination of the characteristic curves of the first and the third stages. The second stage may not be represented, as in Case 29.

REPORT ON THE DISINFECTING AND ANTISEPTIC PROPERTIES OF IZAL

[FROM THE BACTERIOLOGICAL LABORATORY, OWENS COLLEGE.]

By SHERIDAN DELÉPINE,
Professor of Pathology, Victoria University.

AMONG the numerous products which have, of late years, been proposed as advantageous substitutes for some of the older disinfectants and antiseptics, izal is undoubtedly one of those deserving very special attention. Observations made by Dr. Klein nearly three years since have shown it to be capable of killing a large number of micro-organisms associated with various diseases, and this it could do even when sufficiently diluted as to cause no detrimental irritation of tissues.

Among the most remarkable features of this compound are its comparative insolubility and non-volatility at the ordinary temperature, properties which it seems difficult to associate with an active disinfectant, but which numerous experiments have proved not to be incompatible in this case. If we add to these the facts that izal can be freely administered internally, used over extensive wounds, or injected under the skin without bad effects, and, finally, that it does not damage surgical instruments, there are sufficient grounds to justify the impression that izal is a substance of considerable scientific and practical interest.

In the course of numerous experiments on well-known disinfectants, I have come to the conclusion that it is difficult to compare the results obtained by various observers owing to the different conditions under which they conduct their observations, and also because the micro-organisms which they use for the purpose of testing the germicidal properties of various substances differ in their degree of resistance according to the way in which they have been cultivated, kept prepared for experiments, etc. Though accepting fully the results obtained by Dr. Klein and other observers, I, at the suggestion of Mr. J. H. Worrall, thought it might be well to test again the germicidal properties of izal. *I naturally avoided conducting my experiments on the same lines as those fully explained in Dr. Klein's report.*

As it was my intention to study carefully the effects which certain disturbing factors might have on the results obtained, I investigated the action of izal on a small number of germs. I selected them so as to get types of the most important forms of pathogenic bacteria which one might have to deal with in practice. These organisms were :—(1) The bacillus tuberculosis (hominis); (2) the bacillus coli communis (which I preferred to the bacillus of typhoid fever for reasons given further on);

(3) the staphylococcus pyogenes aureus ; (4) the bacillus anthracis (in the sporing stage). In the course of the last seven months I have conducted, with the valuable assistance of Dr. F. Coutts, over 115 experiments with these four microbes, paying special attention to the conditions of growth, temperature, dryness, age of germs, etc., etc., which might be expected under ordinary circumstances to influence the resistance of bacteria or the activity of any disinfectant. A careful record of each experiment has been kept, but in order to diminish the bulk of this report a summary only of the results will be given here.

I.—ACTION OF IZAL ON THE TUBERCLE BACILLUS.

(a) *Sputum* obtained from a case of advanced phthisis pulmonalis, and found teeming with tubercle bacilli, was allowed to dry on paper for seven days, being kept during that time in a closed capsule in the dark at the temperature of the laboratory (15 to 20°C). Pieces of paper so prepared were then severally steeped, 1° in izal, 2° in izal, one part of which had been diluted with five parts of water, 3° in izal diluted with ten parts of water. In each case the infected paper was allowed to remain in the disinfecting fluid for forty-five minutes, after which it was removed and inserted under the skin of a guinea-pig. In a control experiment, paper smeared with the same quantity of the same sputum, and prepared at the same time and in exactly the same way as the other pieces of paper, was also inserted under the skin of a guinea-pig of the same age and size as the other guinea-pigs.

In all the cases in which the sputum had been treated with izal, fifty-four days after inoculation, no evidence of tuberculosis was found "post mortem," even at the seat of inoculation ; whilst in the control animal tuberculosis was already well marked on the twenty-seventh day, and very advanced on the fifty-fourth.

(b) Similar results were obtained with paper smeared with scrapings of a *tuberculous gland* obtained from a case of recent general tuberculosis, the tubercular matter being allowed to dry as in the previous case.

(c) Fresh tuberculous matter from a cheesy lymphatic gland (tuberculosis of 56 days duration) was made into a thick emulsion with sterilised water. This was mixed with izal, one part of which had been diluted with ten parts of water, and after two minutes the excess of izal was removed with sterilised filter paper. The thick pulp left was allowed to dry for twelve hours, and then a guinea-pig was inoculated subcutaneously with it.

A control guinea-pig was inoculated with exactly the same quantity of a part of the original emulsion of cheesy gland which had not been treated with izal. After 54 days the first animal showed no trace of

tuberculosis at the post-mortem examination. The control animal was already in an advanced state of tuberculosis at the end of three weeks, and the disease was found, post mortem, to be extensive 59 days after inoculation.

It is evident from the foregoing experiments that izal mixed with ten parts of water will disinfect in 45 minutes dried tuberculous sputum or other tuberculous matter, and that fresh tuberculous products of great virulence when mixed with about an equal quantity of izal of the same strength as above, and allowed to dry at the ordinary temperature for twelve hours, are also completely disinfected.

I am unable to state how much shorter time or greater dilution the disinfectant will admit.

In interpreting the results it is necessary to remember that the bacillus tuberculosis, though not known to be a sporing organism, is one which is not easy to kill under ordinary circumstances. This is due to the bacillus being usually embedded in thick mucus or in cheesy products which effectually offer a barrier to some of the best chemical disinfectants (owing to their being usually at the same time capable of causing coagulation of albuminous compounds). The great resistance which the bacillus presents to the effects of drying is another reason why it is so difficult to kill, for as desiccation is not fatal to it, the germ may remain active in the midst of masses too dense to be penetrated by disinfecting solutions of poor penetrating power or incapable of acting for a considerable length of time.

It will be noticed that I have used the inoculation of guinea-pigs to test whether disinfection was complete or not. This I have found by previous and somewhat extensive experience to be the only reliable method in the case of tuberculosis.

II.—ACTION OF IZAL ON THE BACILLUS COLI COMMUNIS.

The bacillus used in these experiments had been obtained from fatal cases of Asiatic cholera.

Before being used, the microbe had been cultivated for nine days on potato, the growth then scraped off and mixed with sterilised alkaline broth. With the emulsion so obtained, silk threads were impregnated. These threads were allowed to dry for six hours in a sterilised capsule in the dark, the temperature being about 15° to 20°C. After this they were placed severally in izal diluted with 5, 10, 50, 100, and 200 parts of water, and allowed to remain in the mixtures for one minute in the case of the stronger solutions, and for ten minutes in the weaker ones. After this they were transferred to tubes containing alkaline bouillon, some being previously washed in sterilised water, others not. Control

threads not having been exposed to the action of the izal, but having been kept in sterilised water for the same length of time as the other threads had been, were also cultivated in alkaline bouillon.

After twenty-four hours at 36° C. the control tubes showed already typical growth of *bacillus coli*, but there was no growth in any of the tubes containing threads which had been dipped in izal. These tubes were watched for twenty days, and during the whole of that time no trace of growth could be discovered.

This absence of growth was tested not only by microscopical examination, but also by plate cultivations in nutrient gelatine and agar.

It is therefore evident that izal diluted with 200 parts of water is a safe germicide for micro-organisms as resistant or less resistant than the bacillus coli communis.

The *bacillus coli* (or, to be more correct, bacilli having characters associated with that name) *communis* is especially suitable for these kind of experiments; it is constantly found in the intestine. In several enteric diseases, such as typhoid fever, Asiatic and English cholera, dysentery, it multiplies considerably. In many of these cases it is apparently the cause of severe symptoms or complications. It has become evident of late that bacilli of this type may invade other parts of the body than the intestine, and give rise to severe inflammation (peritonitis, pleurisy, meningitis, hepatitis, abscesses, etc.). It is also found outside the body in all media contaminated with faecal matters.

Moreover, the *bacillus coli* has a considerable power of adaptation, growing well on strongly alkaline, or distinctly acid, on vegetable or on animal media, such as blood serum, milk, urine, faeces, etc., etc. It bears drying better than the *bacillus* of cholera and resists the action of such disinfectants as carbolic acid, formalin, hydrochloric acid, much better than the typhoid *bacillus* and the cholera vibrio.

III.—ACTION OF IZAL ON THE STAPHYLOCOCCUS PYOGENES AUREUS.

The *staphylococcus pyogenes aureus* was selected as being one of the most resistant cocci. It is widely distributed in external media and is undoubtedly one of the commonest causes of suppuration. It was, therefore, a fair specimen to use for testing the value of izal in the treatment of ordinary wounds.

In this case fresh cultivations of agar were made; after being kept for 48 hours in the incubator at 36°C the tubes were left for another 24 hours at the temperature of the laboratory. The growth was then scraped off, and spread thickly on small pieces of sterilised filter paper. The paper so infected was allowed to dry slowly at the ordinary temperature, in a sterilised capsule, kept in the dark, for three hours.

These pieces of paper were then steeped in izal diluted either with 100 or with 200 parts of water, and left in the mixture for two hours, one hour, or ten minutes.

After these various exposures, the pieces of paper were removed, washed carefully in sterilised water, and dropped into tubes containing alkaline bouillon. In a control experiment the paper was left in sterilised water for the same length of time as the other papers had been left in izal, and then transferred to alkaline bouillon.

From none of the papers treated with izal diluted with 100 parts of water could any growth be obtained. The same was true when izal was diluted with 200 parts of water, except when the exposure was not more than ten minutes in duration.

The bouillon inoculated remained clear for three days (during which it was kept at the temperature of 30°C.), and at the end of that time it was impossible to obtain any evidence of growth by plate cultivations in nutrient gelatine. (A sufficiently large quantity of the bouillon being used in each case to prevent any chance of error.)

In the control experiments well-marked growth was obtained at the end of 24 hours; at the end of 36 hours the bouillon was very turbid. Plate cultivations made with this culture proved that nothing but the staphylococcus pyogenes aureus had grown in the bouillon.

From this it seems evident that izal diluted with 100 parts of water is a reliable antiseptic for the dressing of surgical wounds, made with the usual antiseptic or aseptic precautions.

IV.—ACTION OF IZAL ON THE BACILLUS ANTHRACIS.

In making experiments with the bacillus anthracis it was not thought necessary to study the action of izal on the non-sporing organism. Spores of great virulence were used. These spores were prepared in the same way as those which I had used in previous experiments, and which I had found to resist ordinary disinfectants in usual dilutions, with the exception of the most powerful chemical agents. Judging by the results obtained with carbolic acid, I did not expect that izal would be capable of killing these spores in a reasonable time, and the results justified my expectations. The most interesting results obtained were those proving the remarkable inhibitory power which even diluted izal had on the growth of the anthrax spores. Thus in alkaline bouillon to which the 100th part of izal had been added it was impossible to get the spores to show any sign of growth, even when kept at a temperature of 36° C. for seven days, no precaution being taken to prevent the volatilisation of izal. The spores, however, were not killed, for after thorough washing in sterilised water and cultivation in fresh bouillon, abundant growth was obtained.

GENERAL CONCLUSIONS.

Summing up the results of the experiments just recorded I think that *izal* diluted with 100 or even 200 parts of water is a powerful and reliable antiseptic when contact of a sufficient length of time is secured. As an antiseptic it is more powerful than carbolic acid, and, if it be remembered that it causes very little irritation of living tissues, that in moderate doses it is not poisonous, and that, practically speaking, it is not volatile, there can be little doubt as to the immense advantages which *izal* possesses over carbolic acid in many directions.

CHRONICLE.

Medicine.

UNDER THE CHARGE OF JULIUS DRESCHFELD, M.D., F.R.C.P.

SIMON (CHARLES E.). "The modern aspect of indicanuria."—*The American Journal of the Medical Sciences*, July—August, 1895.

AFTER a lengthy historical and clinical investigation of the condition known as indicanuria, the author arrives at the following conclusions:—

- (1) The gastric juice possesses antiseptic and germicidal properties.
- (2) These properties are referable to the presence of free hydrochloric acid.
- (3) A subnormal amount of free hydrochloric acid will call forth an increased degree of intestinal putrefaction.
- (4) The conjugate sulphates form an index of the degree of intestinal putrefaction.
- (5) The increased intestinal putrefaction in cases of subacidity and anacidity of the gastric juice is largely referable to an increased formation of indol.
- (6) The elimination of indican in the urine may be regarded as an index of the amount of free hydrochloric acid present.
- (7) A normal acidity of the gastric juice is never associated with increased indicanuria.
- (8) Cases of ulcer of the stomach apparently form an exception to this rule, an increased indicanuria being usually associated with hyperchlorhydrie.
- (9) In other cases of hyperchlorhydrie a subnormal or normal amount of indican is eliminated.

(10) Simple constipation is rarely accompanied by an elimination of indican.

(11) Diarrhoea referable to a catarrhal condition of the colon, often following a previously existing coprostasis, as well as diseases of the colon in general, is not associated with an increased indicanuria.

(12) In the differential diagnosis between ileus and coprostasis, a small amount of indican excludes the former condition.

(13) In cases of anachlorhydrie, with much lactic acid, the indican is not necessarily increased.

(14) No indican, or but little indican, with a delayed Günzburg potassium iodide reaction, indicates the absence of free HCl, with much lactic acid.

(15) Much indican, with a normal or anticipating Günzburg reaction, is suggestive of ulcer.

(16) In cases in which the use of the gastric tube is impractical or contra-indicated, or in cases of a mere superficial examination, the indican reaction will furnish a valuable index of the condition of our patient's digestive powers.

(17) By means of the indican reaction, we are enabled to follow closely the results of treatment instituted in cases of gastro-intestinal disease.

The following are, however, added as the necessary premises:—

(1) That a resorption of decomposing pus is not taking place anywhere in the body, as such a process in itself is capable of producing an increased elimination of indican.

(2) That there does not exist a stenosis of the small intestine.

(3) A normal mixed diet, containing no excessive amounts of red meat.

FISHER (THEODORE). "Alcoholic disease of the heart."—*The Bristol Medico-Chirurgical Journal*, June, 1895.

It is only within the last few years that alcohol has been suspected of producing definite cardiac disease. Bollinger, of Munich, appears to have been the first to draw attention to this association. He noticed that in 1,000 necropsies there were 46 cases of large heart, in which the ordinary causes of enlargement, such as valvular disease, arterio-sclerosis, and granular kidney were absent. He also noted the occurrence of excessive beer-drinking as the chief ætiological factor. Frequently when the pathologist can find no recognised cause for a hypertrophied and dilated heart, the clinical record of the case will prove distinct alcoholic intemperance.

Alcoholic enlargement of the heart is probably far from uncommon. During the past year Dr. Fisher states that six cases have been under

observation in the Bristol General Hospital. Cases vary considerably in their clinical features. Death may occur within a few days of the onset of the cardiac failure. The Guy's Hospital Records and the statistics of Manchester cases as published by Dr. Graham Steell seem to show that a comparatively long history is more common. Dyspnoea sometimes manifests itself in sudden nocturnal attacks.

The patients are mostly beer drinkers and usually rather stout, and cyanosis is often an exceptionally noteworthy feature.

The character of the heart sounds varies considerably in different cases, and even in the same subject at different times.

The liver is usually much enlarged, but cirrhosis appears to be exceptional.

The cardiac enlargement, due to overwork, is somewhat allied to alcoholic hypertrophy of the heart in its clinical aspects. Here the history must be relied on. It seems likely that hard work and heat combined are more potent than hard work under more normal circumstances.

In the treatment of these cases, baths and exercises, according to the Schott methods, undoubtedly prove of considerable service.

GOODHART (JAMES F.). "A series of cases of thrombosis of the leg in influenza."—*The Practitioner*, August, 1895, p. 125.

THE author has met with thrombosis in influenza so frequently that he is led to believe there must be some intimate relation between the two, and in the present paper he places his evidence of the fact on record. Dr. Goodhart believes that a recognition of this association has in more than one instance enabled him to diagnose the nature of the case, when as yet it was but doubtful. Several cases are briefly recorded. In all the possibility of typhoid was carefully excluded. All these cases recovered. Reference is made to two cases in which thrombosis of the upper extremities occurred. In all the thrombosis was apparently the effect of the influenzal poison.

GUTHRIE (LEONARD G.). "Three cases of scaphocephalus."—*The Clinical Journal*, July 31, 1895.

THE characteristics of scaphocephalus, or "boat-shaped skull," are: (1) Increased length; (2) diminished breadth; (3) absence of parietal eminences; (4) projection of the parietal and occipital bones; (5) the presence of a keel-shaped ridge along the line of the sagittal suture, which sometimes extends to the interfrontal suture, and still further heightens the general resemblance of the cranium to a boat; (6) there is usually increased height of the skull from base line to vertex.

Premature synostosis of the sagittal suture is usually regarded as the cause of scaphocephalus. It has been attributed to intra-uterine inflammation, either idiopathic or dependent on injuries to the mother whilst pregnant. It has also been traced to injury at the time of birth, to the use of forceps, or to the effect of protracted labour.

The author records three typical cases, and gives photographs and tracings. The above-mentioned characters were well marked in each case. The children were all males. They were born at full term. Labour in two of the cases was easy and natural; with the third (an imbecile) it was tedious, but forceps were not used. None of the children were first-born. There was no history of similar maldevelopment of the skull in the families of any of them.

The causation and pathology are discussed, and useful references given.

WALDO (HENRY). "The paralysis of osteo-arthritis."—*Bristol Medical-Chirurgical Journal*, June, 1895.

MANY cases of osteo-arthritis are associated with loss of power, and often with some slight sensory affection.

This loss of power depends partly upon the pain in the joint which movement causes, and which is generally attended with stiffness, but the chief loss of power is due to the great wasting of the muscles. The muscles which waste are chiefly those which extend the affected joint. Sometimes the flexors are also involved, and also the muscles of the limb that are near, but do not move the affected joint. The atrophied muscles are nearly always on the proximal side of the affected joint. The wasting increases for some weeks, then becomes stationary, and continues as long as the joint disease lasts. If the joint recovers, the muscles usually slowly regain their normal size. The atrophy of the muscles is generally accompanied by a distinct increase in myotatic irritability.

This atrophy is usually considered as of reflex origin, due to the disturbance of some nutritive nervous centre, irritated by the painful state of the sensitive nerve-fibres. Some consider the wasting as directly due to alterations in the nutrition of the ganglion cells of the cord. The paresis in these cases does not at all correspond to the ordinary cases of peripheral neuritis.

The local treatment depends upon the nutrition of the muscles, which is best carried out by electrical stimulation and gentle rubbing; such, however, should be delayed until the joint pain has subsided.

T. N. Kelynack.

Surgery.

UNDER THE CHARGE OF THOMAS JONES, M.B., B.S., F.R.C.S.

WHITE. "Castration in hypertrophy of the prostate."—*Annals of Surgery*, July, 1895.

THE author makes an exhaustive review of the whole subject based on an analysis of one hundred and eleven cases. The evidence in favour of the operation he discusses under three heads—theoretical, clinical, and experimental.

(1) *Theoretical*.—The function of the testis is two-fold : (a) To produce spermatozoa, and (b) to control and determine the development of male characteristics. The effect of this latter quality, which may be exercised where the former fails, may be produced either reflexly through the nervous system, or through the medium of some substance produced by the seminal cells and absorbed into the system. The observations with Brown-Séquard's testicular fluid seem to point to some such function.

Williams ("Diseases of the Breast," p. 138), suggests that tumour growth results from some disturbance of the "force" which regulates cell-activity, and, applying this theory, the author of the present paper thinks that some modification of the testicular function may be, as far as prostatic overgrowth is concerned, equivalent to failure of this general restraining force. "The persistence of what may be called unexpended energy during the ovule- and sperm-producing life of the ovaries and testicles respectively, might thus offer a reasonable explanation of the overgrowth in question, while the final atrophy of the former organs would similarly be accompanied in many cases by such a withdrawal of nervous and vascular supply as would prevent the occurrence of hypertrophies, or even cause their disappearance if they had already formed." That this is true in regard to uterine fibroids is certain ; that the evidence is not so definite as regards prostatic overgrowth is probably due to the fatal complications, cystitis and kidney disease, of the lesions ; for Messer's tables show that among octogenarians the prostate is more frequently below than above its normal weight of six drachms.

The author admits the extremely theoretical nature of his views, but insists that the analogy between prostatic and uterine growths (on which they are founded) so far from concealing our ignorance, as Moullin fears, gives us a sort of practical working hypothesis.

(2) *Clinical*.—In his analysis of one hundred and eleven cases, and the discussion thereon, due regard is paid to the important question of

the influence of rest and palliative treatment previous to the operation, and to the fact that but a short period has elapsed on which to base any statements as to permanency of cure. He considers that thirteen deaths may with justice be eliminated, the patients being practically moribund from septic cystitis and kidney disease. This brings the mortality down to 7.1 per cent. Only nineteen cases were definitely stated to have not improved at the expiration of varying periods, and of these nineteen, nine were included among the deaths, leaving only ten per cent of apparent failures. No mental nor physical changes whatever, except favourable ones, were noted in a single one of the successful cases, some of them now dating back for nearly a year and a half. The number of cases recorded of death with preceding mental symptoms is certainly no higher than in any other serious operation upon persons of similar age. After reviewing the other procedures appropriate to the various conditions of prostatic hypertrophy, the author gives the following advantages which the operation of double castration has over supra-pubic prostatectomy. (a) The mortality is less, 18 per cent including all cases; while that of the first extensive series of the supra-pubic operation was 25 per cent. (b) The re-establishment of almost perfect health in 51.2 per cent within four to twelve weeks. (c) More than 70 per cent of the cases in the table had been observed for over three months and no relapses recorded. (d) No troublesome fistulæ disturb the patient.

(3) *Experimental*.—Fairly numerous cases have been recorded of single castration for tumour or disease of the testis, with some note of the effect on urination. In addition to evidence of this sort, the author records a large number of experiments on dogs, with a complete microscopical examination of the prostate and testis. The results of his experiments are briefly as follows:—(a) There is no definite evidence to show that unilateral castration diminishes the whole or the corresponding half of the prostate. (b) Griffiths (*Lancet*, April 13, 1895) showed that ligature of the vas deferens in the dog did not interfere with the structure of the seminal tubules, nor with the production of spermatozoa. In one case, however, the testicle atrophied, probably owing to injury to other structures of the cord. The author's experiments on the dog showed that ligature or section of the vas produced very little change in the testis, but every dog which died after eight days exhibited constant loss of weight in the prostate. (c) Ligation or section of the vascular structures of the cord caused degeneration or sloughing of the testicles, the prostate atrophying to some extent at a later period. (d) Ligation or section of the entire cord caused marked prostatic atrophy following sloughing of the testicles.

Conclusions.—(1) The theoretical objections urged against double castration have been fully negated by clinical experience, which shows that in approximately 87·2 per cent rapid atrophy of prostatic enlargement follows the operation; that cystitis is relieved (52 per cent); that vesical contractility returns (66 per cent); and that there is a return to almost normal conditions (46·4 per cent). (2) That in patients operated upon under surgically favourable conditions—i.e., before the onset of uræmia or before the kidneys have become disorganised—the mortality was 7·1 per cent. Even of the desperate cases 15 (75 per cent) showed improvement of symptoms or marked atrophy of the prostate before death. (3) That castration gives better results than perineal prostaticotomy or than supra-pubic prostatectomy. (4) That in some cases unilateral castration may be followed by unilateral atrophy of the prostate. (5) Division of ligature of both vasa deferentia in dogs causes marked loss of weight in the prostate. The absence of corresponding testicular change points to the possibility of this being the result of injury to some other part of the cord. (6) Ligation of the vascular constituents of the cord produces atrophy of the prostate, but only after first causing disorganisation of the testes.

W. P. Montgomery.

SNOW (H.). I.—“Conditions of radical cure in cancer, etc.” II.—“Tumours of the breast which are ‘dispersible without operation.’” III.—“The conversion of benign tumours into cancer.” IV.—“The practical outcome of recent researches on cancer.”—London: J. and A. Churchill. 1895.

IN these four reprints of recent papers placed together in one volume, Dr. Snow brings before the profession and emphasises his views in regard to cancer.

He speaks very definitely regarding the period during which only operation can possibly prove permanently successful, placing it within much narrower limits than others would be prepared to accept.

In the first paper he speaks of rodent ulcer as the “least cancerous of cancers,” being totally devoid of auto-infective phenomena in the shape of metastatic deposits, and showing in the tardiest and mildest form the “progressive tendency to death.”

The lesion is readily extirpated within the first eighteen months or two years of inception.

Epithelioma ranks next in progressive order of malignity, being differentiated from carcinoma by the fact that the metastatic particles are arrested by the adjacent lymph glands, and very rarely reach the blood

stream. Radical extirpation may be effected by the removal of the primary lesion and all the dangerous glands near, "provided that this removal takes place before the *relatively late* stage of enlargement." The surgeon must not wait till glands enlarge before proceeding to their excision. Dr. Snow does not trust the statistics in regard to removal of labial cancer by simple V-incision.

In the rectum, cylindroma usually develops slowly, and seldom infects lymph glands or liver for twelve months from inception. Hence free excision within that period should suffice.

Cancer of the cervix uteri must be dealt with within eight weeks, or recurrence will quickly ensue by way of the lymphatic plexus in the vaginal sub-mucosa. Supra-vaginal amputation is the treatment, hysterectomy being reserved for late cases and for disease within the uterine cavity. With malignant developments of the connective tissues (true sarcoma) no infection of adjoining glands by lymphatics is found; diffusion is by the blood.

Removal must be undertaken before the cell particles have passed into the blood current. Sarcomata of the long bones should be treated by amputation at the proximal articulation.

Carcinoma of the breast Dr. Snow believes to always follow some definite exciting cause, such as a blow or mental trouble, producing aberrations in the normal devolution of the organ.

The mamma undergoes evolution between the ages of fourteen and twenty-five; for the next ten years temporary involution follows upon pregnancy. The devolution, or stage of permanent degeneracy, commences about the age of thirty-five, and is the epoch affected by carcinoma almost exclusively.

Infection of the lymph glands in the axilla is "rarely delayed beyond eight weeks." When enlargement of these glands takes place, the lymph current cannot pursue its ordinary course, and regurgitation takes place in abnormal directions, leading to deposits in the marrow of the adjoining bones, the humerus and the sternum. This marrow infection takes place "simultaneously with palpable enlargement of the axillary glands." Marrow infection, after excision of the mamma at a later period than eight to twelve weeks, manifests itself by symptoms after a variable period rarely exceeding five years.

"In order to surgically eradicate a carcinomatous breast, therefore, in an average non-atrophic case, *an operation must take place within six to twelve weeks of inception*, prior to lymph-gland enlargement, and before the possible advent of marrow infection." The axilla must be cleared out before the lymph glands have had time to enlarge. The author describes cases showing marrow infection, and refers to a paper in the

Lancet, March 7 and 14, 1891. Dr. Snow adds an important and interesting note on the use of opium, which he enjoins on all his breast excision cases immediately after convalescence. He considers it to be the only drug which markedly checks the growth of carcinomata, and its early employment, even when no surgical operation takes place, will commonly add years of comfortable life.

In his second paper Dr. Snow speaks of the fibroma of adolescence, a nodular tumour occurring in the breast in girls from 14 to 25 years of age, and often induced by obstruction of mammary development through tight corsets. The author orders the following ointment to be rubbed in four times daily :—Powdered lead iodide 1 drachm, lanoline 2 drachms, lard to 1 ounce ; and gives 15 grains of bromide of potassium at bed time to subdue the always present neurosis. The "lump" will usually vanish in a few weeks.

At a later period of life small indurated tumours of an inflammatory origin are met with, which also yield to local treatment by inunction. A third class of dispersible tumours occur through inflammatory changes in, or cystic dilatations of, lactiferous ducts. After the adolescent period even simple fibromata yield far less readily to treatment, and the earlier they are dealt with the better.

The third paper deals with the conversion of benign tumours into cancer. Dr. Snow believes there is no absolute line of demarcation between malignant and non-malignant growths. He defines a cancer as a lesion consisting in the luxuriant proliferation of certain cells which have acquired *autositic* properties, and whose growth is therefore independent of the forces controlling the remainder of the organism.

Even some of the most familiar of the benign tumours, such as lipoma and sebaceous cysts, occasionally become the seat of malignant growth. Similarly with bony exostoses. Uterine myomata rather more frequently pass into cancer or "myo-sarcoma." Chronic tumours of cartilage, particularly near the shoulder joint, occasionally display rapidly progressive malignant symptoms, and prove fatal with distant metastases.

There is another class of benign tumours which *always* pass into malignant disease unless previously removed. These are the tumours of the female mamma during the period of devolution.

Cysts are common both as secondary to carcinoma and also as primary lesions, eventually becoming associated with malignant phenomena.

Adeno-fibroma, or cystic fibroma, often attain considerable bulk, but in the end exhibit malignant manifestations. In the fourth paper Dr. Snow speaks of the practical outcome of recent researches on cancer.

The first he takes up is the insidious infection of bone-marrow by mammary carcinoma, already referred to in the first paper. The most striking symptom is a slowly progressive prominence of the sternum at the junction of the upper and middle portions of that bone. The phenomena are developed in all ordinary cases of breast carcinoma not excised within two or three months, usually appearing four to five years after removal of the breast.

Dr. Snow considers this explains many mysteries which have attended carcinoma of the mamma, such as great tendency to recur after excision, and to deposit long afterwards in the opposite breast. Obscure bone lesions, known as mollities ossium, osteitis deformans, osteoporosis, etc., have been identified sometimes with the presence of a malignant deposit in the marrow. Of 150 cases of mammary carcinoma, seen at an average date of ten months from inception, 90 showed well-marked symptoms of marrow infection at the first interview, and others developed them later, so that excluding "atrophic" cases, Dr. Snow believes that marrow infection may be traced in 80 per cent.

He then reaffirms his belief in the marked action of opium in the retarding growth of cancer and delaying death, and pleads for its exhibition in the very earliest stages. He says the practice of withholding opium until pain compels its use is simply barbarous. He points out that the beneficial effects of opium are scientifically comprehensible when taken in conjunction with the indisputable frequency of supervention of mammary or uterine cancer upon an epoch of keen mental distress and anxiety.

He points out that cancer rarely kills so much by its growth on the primary site as by the infective metastasis. Therefore a permanent cure can always be effected in the organs with which the surgeon is mainly concerned, provided not only the part first diseased, but also the tissues ordinarily infected secondarily be timeously removed. The lymph glands in the definite "infection path" should always be removed "before the relatively late stage of enlargement."

In the case of sarcoma, however, enlarged lymph glands are proof of infection of the blood current, and imply visceral deposita. Hence, excision of the glands will be futile, and it will generally be unwise to touch surgically the primary new growth. In recent cases with no affection of lymph glands there is no object in the removal of these along with the primary tumour, whilst in cases of early carcinoma, removal of the adjacent lymph glands is imperative.

Francis J. H. Coultis.

Midwifery and Diseases of Women.

UNDER THE CHARGE OF W. J. SINCLAIR, M.A., M.D.

ON ENDOMETRITIS.—From the Proceedings of the German Gynæcological Society, at Vienna, June, 1895.—*Centralblatt für Gynäkologie*, No. 26.

FEHLING: Halle. "Treatment of endometritis."

In the treatment of acute puerperal endometritis it is superfluous to draw any sharp distinction between the putrid and septic varieties. At the commencement of pyrexia in childbed, vaginal irrigation (expulsion of the decomposed secretions by means of uterine contraction); flushing of the uterine cavity is only of use for the first six days or thereabout; in case of abortion for two days only. Curetting of the puerperal uterus in acute puerperal endometritis is not recommended by the author. He thinks it is theoretically wrong, for in putrid endometritis douching is sufficient for the expulsion of the necrotic decidua, and in the septic form the streptococci have penetrated the muscular tissue within three or four days. Scraping is only to be recommended (1) in case of a fresh development of endometritis in a fortnight or later (retention of threads of placenta or membrane, lochiometra). (2) In endometritis post partum with retention of portions of ovum and decidua. Plugging of the puerperal uterus with iodoform gauze is only suitable as the complement to curetting in case of excessive hæmorrhage. In acute endometritis not of puerperal origin, which is for the most part gonorrhœal in character, intra-uterine treatment should only be resorted to when the presence of disease of the appendages has been positively excluded.

With regard to the chronic varieties of endometritis, there should be no local treatment in endometritis depending upon a constitutional condition in virgins and nulliparæ. In the chronic infectious varieties of endometritis, inter-current attacks of acute or sub-acute inflammation of the uterus itself, of the parametrium, or of the pelvic peritoneum, are to be looked upon as contra-indications to local treatment. All intra-uterine treatment should be undertaken with the most exact attention to antisepsis and asepsis. If the cervical canal is not sufficiently wide for the treatment it must be dilated. Dilatation is required in order to permit the passage through the narrow cervix of sounds, curettes, etc., with a diameter up to 8 or 10 millimetres. The dilatation of the cervix, so as to permit the passage of the finger, can only be effected safely and rapidly in the uterus post partum or post abortum. Laminaria tents are the most effective means of rapid dilatation of the cervix, and complete

dilatation to permit of digital exploration of the uterine cavity should be restricted to cases of suspected malignant growth, etc.; that is, as to diagnosis, not treatment.

In describing intra-uterine treatment, the author calls attention to the following points. The probe to be introduced should be surrounded with cotton wool to such an extent only as to permit it to easily pass the os internum; for this purpose he prefers Playfair's probe. The American sound, recommended by Säger, he has not found so suitable. Instead of syringing out the cervix before the application of chemical substances, Fehling recommends swabbing of the cavity with dry cotton wool and then swabbing with an antiseptic solution. He prefers therapeutic plugging of the uterine cavity to washing out in chronic catarrh. He speaks well of Apostoli's method, especially in climacteric hæmorrhage, the anode being introduced into the uterus. The principal proceeding in the treatment of endometritis, scraping of the mucosa, is, without doubt, too frequently practised. In chronic catarrhal endometritis it is only exceptionally indicated, and that when other methods of treatment have failed. An essential condition to undertaking this method of treatment is the absence of acute or subacute inflammation about the uterus or appendages. He is of opinion that unfavourable consequences follow scraping in ten per cent of the cases. He is in favour of oöphorectomy when endometritis keeps recurring owing to the presence of myoma, and of vaginal extirpation of the uterus when accompanying severe metritis has resisted all attempts at cure.

When a cervical catarrh has been diagnosed it should always be treated locally. Even during pregnancy cautious treatment of cervical catarrh with erosion, with the object of modifying the endometritis decidualis, is a rational proceeding. Vaginal douching should be carried out while the patient is in the recumbent position, and the patient should lie still ten minutes after the completion of the process. The application of medicated powders should be made after careful drying of the portio vaginalis; to parts inside the cervical canal, liquid caustics are most conveniently applied: retention cysts should be thoroughly scarified. For extensive erosion of the mucous membrane of the vaginal portions, Fehling recommends the sharp spoon, to be followed, when necessary, by the Paquelin cautery. He also admits that there may be a place for Schroeder's method of excising the mucous membrane of the cervix, or for Martin's wedge-shaped incision.

W. J. Sinclair.

WINCKEL: Munich. "The etiology of endometritis."

ALTHOUGH the endometrium of the body and that of the cervix of the uterus differ from one another in important points, the diseases of the endometrium in both portions extend from one to the other, or originate

simultaneously. The treatment of endometritis of the two parts should therefore be carried out as if they were anatomically one. With regard to the causes of endometritis, there has been, in recent years, a considerable increase in our knowledge, and on this ground the author draws a distinction between the simple forms of endometritis, not hitherto recognised as of bacterial origin, and the suppurative bacterial forms.

(1) *Simple uterine catarrh* arises from various widely different causes, but disturbances of the circulation lie at the root of all of them (clothing, constipation, chlorosis, etc.).

(2) *Hæmorrhagic endometritis* arises through burns and poisoning, as well as in the acute infectious diseases. In cases of burning, it is probable that the finest vessels are blocked owing to increased formation of blood discs; in poisoning, the hæmorrhage arises from fatty degeneration of minute arteries. In the infectious diseases it is most probable that the actual cause of the general disease also produces the endometritis, or it is produced by some other bacterium occurring in association with the cause of the infectious disorder, as *e.g.*, streptococcus with diphtheria.

(3) *Endometritis decidualis* is the term applied to the form of simple endometritis resulting from premature interruption of pregnancy.

(4) *Endometritis exfoliativa* is looked upon by most gynæcologists as the result of a local inflammatory process.

Our knowledge of the nature of many of the forms referred to by writers is still defective. By some authors, every form of endometritis is said to depend upon pathogenic micro-organisms. Concerning the following varieties of bacterial suppurative endometritis, this proposition holds good, that whilst a few individual kinds of micro-organisms which produce endometritis may invade the completely intact mucous membrane, the great majority of them only obtain a hold upon the mucous membrane when it is in a sense prepared for them by injuries, œdema, or the presence of other bacteria.

(5) *Endometritis gonorrhœica*.

(6) *Endometritis tuberculosa*, which is very rare as compared with the gonorrhœal form. It extends from the Fallopian tube, rarely from the vagina or cervix. Corneil maintains that the uterine mucosa is as sensitive to the contact of the tubercle bacillus as that of the intestine.

(7) *Endometritis septica puerperalis*. The most important of the producers of this group are the streptococci. If, in spite of all antiseptic precautions, 15 per cent of all puerperæ are, for a longer or shorter time, in a febrile condition, in 10 per cent of these cases the fever is caused by invasion of streptococci. Depression of health, from previously existing causes, favours the invasion. The staphylococcus is of comparatively small importance in the production of puerperal endometritis. On the other hand, a third micro-organism, which gives rise to pus form-

ation and inflammation, is becoming more fully recognised as a cause of the puerperal diseases, viz., bacterium coli commune.

(8) *Endometritis saprophytica* is produced by a mixture of cocci and bacilli, which readily develop in the lochia, and produce partly foul-smelling discharge, partly poisonous but odourless material. With this form of endometritis Winckel associates *Endometritis purulenta senilis*, which is probably often saprophytic.

(9) *Endometritis diphtherica*, especially the puerperal variety, is not a true diphtheria; it is almost without exception a disease produced by streptococci.

(10) *Endometritis syphilitica* assumes the appearance of a primary cervical endometritis. The mucous membrane of the cervix, swollen and soft owing to laceration ectropium, is a favourite site of infection. A more important form of this variety is *Endometritis decidue syphilitica*.

(11) A form of endometritis has been quite recently proved by Sanger and Colpe to be produced by the growth of a fungus. It assumed the appearance of an obstinate cervical catarrh.

(12) An endometritis produced by amcebæ. Tullio Rossi Doria found in the lumen of uterine glands, which had become distended into cysts, as well as in the cells lining them, bodies of a rounded or ovoid form with nuclei and vacuolised protoplasm. The amcebæ produce an *Endometritis chronica glandularis cystica*, with proliferation of epithelial elements in masses. This may be the earliest stage of malignant disease.

In pursuing the question, "When, how, and where do the micro-organisms gain access to the female genitals?" the author summarises the chief causes of disease during the various stages of a woman's life. He closes this portion of his contribution with this reflection: While we know with a certain amount of exactitude the paths by which infection gains access to the female genitals, yet with regard to a whole series of questions concerning the influences upon which depend the injurious character of pathogenic organisms, present and innocuous up to a given time, we are almost completely in the dark.

The Symptomatology of Endometritis. — Winckel classifies the symptoms of endometritis according to the locality and time of their development, into (1) those which relate to the organ affected; (2) those which act upon neighbouring organs; and (3) the general symptoms. The phenomena referred to the seat of the disease he divides into *functional* and *nutritive*. In the first group he describes the abnormalities of secretion (quantity, colour, consistence, smell, etc.), which may vary greatly. With regard to the local point of origin of the secretion, recent observations prove (contrary to Schroeder's view), that in most cases of endometritis the mucosa of the body contributes very largely to the amount of secretion. The discharges of blood

from the genitals are just as variable as the secretions. The amount of hæmorrhage, its duration, and the features of its course are in no way characteristic of any definite form of endometritis. So variable a symptom as hæmorrhage should no longer be included among those of endometritis. To the functional disturbances belong pain and changes affecting conception, pregnancy, and parturition. The second group of abnormal phenomena includes the *nutritive*. In no case can endometritis exist for any considerable time without the occurrence of nutritive disturbances in the muscular wall of the uterus and its peritoneum (metritis). When the bacterial poison from the cervix penetrates the perimetrio tissues by way of the lymphatics, the result is perimetritic and parametritic inflammation. The author has alluded on another occasion to the fact that tubal changes occur in this way, while the tubal mucosa remains sound. He has also called attention since 1875 to the causal relation between endometritis and the formation of uterine myoma.

Next comes a description of the symptoms affecting neighbouring organs, and the general disturbances of nutrition in their physical and psychical aspects. The appearance of nervous troubles is, as a rule, observed only after the existence for years of an affection of the sexual organs, and even then the development of such symptoms usually requires a predisposition, some congenital tendency combined with bad habits. Numerous disturbances of the general health—nervous dyspepsia, hemicrania, feverishness, loss of health—the author regards not so much as reflex neuroses in the usual sense, but rather as the consequences of an “intoxication” of the body, the consequences of the reception of pyogenic material into the blood.

Winckel attributes the tedious and obstinate character of chronic endometritis, however originating, as compared with inflammation of other mucous membranes arising from the same exciting causes, to the numerous and varied functions of the organ affected. Acute and sub-acute relapses, fresh acute attacks arising from mixed infection, ever recurring infections of the same sort as at first, lead ever afresh to complete poisoning of the whole female system, in which state of matters, in many cases, malignant degeneration at last takes its origin.

RUGE (CARL): Berlin. “Endometritis cervicalis.”

CERVICAL endometritis exhibits especially anomalies of secretion together with reddening and swelling of the mucosa. Instead of discharge there may come on, with gradual narrowing of the os externum, retention of secretion, and a funnel-shaped widening of the canal. The external orifice is not narrow congenitally; the contraction is acquired. In

consequence of the retention there results smoothness, with atrophy of the mucous membrane. In consequence of the anomalies of secretion, there are produced bands in the mucous membrane, distension of mucous crypts, retention cysts, and follicular polypi. In cervical endometritis, the glandular apparatus takes an active part by exuberant growth, yet not to the same extent as in the body, or in case of erosion of the vaginal portion. Peculiar small ulcers must be mentioned as a special feature of this condition. They readily bleed, and may thus even produce anæmia. Owing to the large amount of discharge of blood-serum in many cases, it may be mistaken for malignant ulceration. Epithelial changes do not occur when the os externum is intact; but if there is laceration epidermal activity shows itself. When this process has affected the polypi for some time, they may readily be mistaken, on microscopic examination, for carcinoma.

Cervical endometritis is essentially a consequence of laceration, and as a further complication ectropium ultimately occurs. This last is not a mere displacement of the mucosa, but a condition corresponding in extent to the changes in the substance of the cervix. The mucous membrane remains firmly adherent and immovable. Erosion belongs to the portio vaginalis; ectropium may undergo inflammatory changes; erosion may attack the ectropium. Ruge maintains that the connection between cervical endometritis and endometritis of the body is comparatively slight. Even when there is extensive hypertrophy of the mucosa of the body the cervix may exhibit absolutely no tissue changes; and, contrariwise, the body of the uterus is often entirely unaffected in cervical endometritis.

BUMM: Basel. "On the etiology of endometritis."

THE author discusses the question as to whether bacterial influence is at work in the production of the anatomical conditions found in hyperplastic endometritis or in the inflammatory process indicated by the term catarrhal endometritis. Some investigators have found micro-organisms; others, as Döderlein and Pfannenstiel, obtained purely negative results. Bumm examined 29 cases of endometritis of the body, and he could obtain no trace of bacteria either by microscopic examination of the secretion and tissues, or by cultivation experiments. Of the cases, 16 were of the hyperplastic glandular sort, 10 were the fungous endometritis accompanying fibromyoma, and 3 were of catarrhal endometritis. On the other hand, he found micro-organisms in 7 cases of hyperplasia of the endometrium, in 6 cases of chronic catarrhal endometritis, and in 2 cases of endometritis in fibromyoma. The conclusions reached from the observations are stated as follows:—

(1) In chronic endometritis of the body, both of the hyperplastic and the catarrhal forms, no bacteria can be found either in the secretion or in the tissues of the diseased mucous membrane. The disease of the mucous membrane is not therefore kept up by the action of bacteria.

(2) In a small proportion of cases bacteria are found in the secretion, but not in the tissues. These bacteria are various bacilli and cocci, among which are also found some pyogenic cocci. They are to be looked upon usually as mere accidental accompaniments of endometritis, and they vary according to the character of the secretion. It is possible that owing to the immigration of pyogenic microbes into the uterine cavity, the secretion from the diseased mucous membrane may become purulent (sub-acute septic infection supervening on endometritis).

(3) The view that chronic endometritis has no essential relationship to bacteria does not exclude the fact that disease of the mucous membrane arises from acute septic or gonorrhœal infection, or may remain as a result of such infection.

(4) The import of the presence of bacteria in cervical endometritis is the same as in endometritis of the body.

DÖDERLEIN : Leipzig. "The relations of endometritis to the processes of reproduction."

WHEN at the time of conception the uterine mucosa is in a pathological condition, either the nidification of the impregnated ovum becomes impossible (sterility by the prevention of pregnancy), or early blighting of the ovum results (sterility by habitual abortion). In this way an obstinate fungous endometritis, which develops in every pregnancy as an *endometritis deciduæ* may, just like syphilis, bring about repeated early or premature expulsion of the products of conception. There occurs an *endometritis deciduæ polyposa* from participation of the interstitial tissue, and *endometritis deciduæ cystica* from predominating participation of the glandular apparatus. It is this predominance of gland structure, especially in endometritis decidualis catarrhalis, which is the cause of hydrorrhœa gravidarum.

The condition of the interstitial tissue at the time of conception is the most important factor in the formation of the decidua. In the production of abnormalities of the placenta, such as placenta marginata, and even placenta prævia, the chief cause is exuberance of decidua formation, still within the limit of health. Occasionally, the opposite extreme of decidua formation with necrosis comes into play. Decidual endometritis is also to be considered as the cause of certain subjective disturbances and of pain in the uterus during pregnancy, and of many of the troubles with the placenta in the third stage of labour. It is by

no means proved that there is such a thing as inflammation of the decidua in pregnancy produced by the action of bacteria.

The author next describes the bacteria found in puerperal endometritis, and sums up his statements as follows :—(1) The presence of micro-organisms of any kind whatever in the cavity of the puerperal uterus is of pathological importance. (2) The various indefinite terms implying infection applied to endometritis in childbed should be replaced by the terms pyogenic and sapræmic endometritis. (3) Pyogenic endometritis is the most frequently occurring affection of lying-in women. (4) The severe forms of general infection in childbed have, as a rule, their origin in a pyogenic endometritis. (5) The cause of pyogenic puerperal endometritis is, for the most part, streptococcus pyogenes. Besides this micro-organism, the staphylococcus, gonococcus, and bacterium coli commune have also to be considered. (6) The micro-organisms of sapræmic puerperal endometritis remain still unknown.

Pharmacology and Therapeutics.

UNDER THE CHARGE OF D. J. LEECH, M.D., D.Sc., F.R.C.P.

BOEHM (R.). "Some observations on the action of curarin on the nerve ends."—*Archiv. für Experimentelle Pathologie und Pharmakologie*, Bd. XXXV., H. 1.

THE first portion of this paper is devoted to a discussion of some points connected with the action of drugs on tissues. Boehm thinks the protoplasm of nerve cells, in different parts of the system, exerts a special attraction for certain poisons which he likens to chemical attraction. The motor endings, for example, attract the active principle of curare, and the nerve cells of the respiratory centre other poisons. Whether lethal dosage correspond to the weight of an animal or not will depend on the nerve tissue affected. As curarin acts on the nerve endings of the voluntary muscle its effects are powerful in proportion to the amount of muscle substance present; but muscle substance corresponds, to a large extent, to body weight, so, therefore, does the lethal dose of curarin. When, however, a poison acts on a small area, such as the respiratory centre, owing to the smallness of the mass, the relationship between body weight and lethal dose becomes less marked, especially in the case of strong poisons, as aconitine. The influence of a poison on cell protoplasm, and therefore its action on the function of any special part of the nervous system which attracts it, begins when the smallest amount of poison has entered the blood and increases according to

the rapidity with which the poison is absorbed, but only up to a certain extent, for there is, probably, a saturation point; the cell contents are not capable of uniting with more than a certain amount of the poison even though the quantity in the blood may increase. This saturation point corresponds to the maximum influence of the poison on the nerve area. The excretory organs remove the poison from the blood, and when absorption has ceased and excretion has taken place, to a certain extent, dissociation of the poison from the cell protoplasm begins, the poison passing into the blood again. It is possible, in some conditions, reabsorption of the poison by the cell protoplasm may take place, and this accounts for the marked slowness of the subsidence of poisonous symptoms in some cases. The functions of nerve tissue acted on may be unaltered after dissociation of the poison, as in the case of curarin.

In the second half of the paper the author gives, in a somewhat fragmentary way, the results of some observations he has made concerning curare. He points out that, apart from the difference of activity in the varieties of curare, there is probably also a difference between the effects of the active principles contained in these varieties, for the curarin obtained from one variety may differ somewhat in chemical composition from that contained in another. When the full effects of curarin are obtained, that is, when the protoplasm is saturated, the nerve endings are completely paralysed, but the muscle itself is unaffected. Injected into the lymph sac of a frog, curare may not readily develop the full action, for absorption is interfered with, owing to the influence of the drug on the circulation. From Boehm's experiments it would appear as if the nerve endings in different parts are unequally affected by curare in the same periods of time. In rabbits, for example, the short muscles, such as those of the toes and the ears, are first affected, then the muscles of the extremities, and lastly, the diaphragm. If a frog be subcutaneously injected with .005 to .01 mg. of curarin, and killed in from 20 to 40 minutes, the nerve endings in the muscle are not fully poisoned. Boehm has made experiments by excising the gastrocnemius of a frog in this condition with the nerve attached, and then stimulating the nerve at intervals of two seconds with an induced closing current. The muscle contractions decreased gradually, but not quite regularly, the more fully was the muscle poisoned the more rapidly did the contraction decrease in size. When they were almost abolished stimulation was stopped for from 10 to 15 minutes; on re-applying to the nerve the same strength of current, a good contraction was at first produced, but on continuing the stimulation the contracting power rapidly became less, and was quickly abolished. After another pause contractions could be again induced, but still more quickly decreased in

size. Five series of such contractions were produced, each decreasing in vigour, then the same strength of current no longer sufficed to cause contraction, but with a stronger tetanising current another series of contractions could be obtained, similar to those produced by the weaker current. Finally, the muscle entirely ceased to act to stimulation. Boehm concludes that the nerve apparatus in muscles poisoned by curarin can be fatigued by stimulation and recover after rest. When the nerve has lost its power of exciting contraction owing to repeated stimulation, the muscle acts quite readily, showing that after repeated stimulation of the nerve, its loss of power to contract the muscles is not due to fatigue of the muscle itself. In an unpoisoned animal the muscle may be fatigued even more quickly than the nerve ends by continued and frequent stimulation, but the fatigue of the nerve endings cannot be produced as in partial curarin poisoning.

D. J. Leech.

SURMONT (H.) et VERMERSCH (A.). "On the antiseptic action of veratrol."—*Comp. Rend. d. l. Soc. de Biol.*, August 2, 1895.

SURMONT (H.) et VERMERSCH (A.). "Note on the physiological action of veratrol."—*Comp. Rend. d. l. Soc. de Biol.*, August 2, 1895.

THIS substance was studied by the authors with a view to therapeutic application. Chemically it is the di-methyl ether of pyrocatechin, and is closely allied to guaiacol, which is the mono-methyl ether of the same substance. It is a liquid with an agreeable aromatic odour, and readily vaporises. It boils at 201°—205°C., and solidifies at 15°C. to a crystalline mass. It is very soluble in alcohol, ether, and oil, but practically insoluble in water and glycerine.

The experiments to test its antiseptic power were conducted in the usual way by adding a known quantity of the substance to a definite amount of a culture medium (in the present case bouillon), or by submitting silk threads impregnated with a micro-organism to the action of a solution of the drug of known strength for a certain definite time. The bacilli of tubercle, typhoid fever, cholera, diphtheria, and blue pus, and staphylococcus pyogenes aureus were experimented with. Tubercle, cholera, and diphtheria bacilli and the bacillus pyocyaneus were the most susceptible to its action, staphylococcus pyogenes aureus the least.

Administered to animals it produces more or less intoxication according to the dose. In dogs 25 cg. per kilogramme of body weight produces little effect; 50—75 cg. cause restlessness and stumbling, and 1.50 g. per kilogramme kills in 12 hours. Guaiacol in the dose of 0.50 g. per kilogramme of body weight causes death in the same time.

Veratrol may be absorbed from the lungs by inhalation, from the alimentary canal, from the subcutaneous tissue, and from the skin. It is excreted by the lungs, the gastric and intestinal glands, and the kidneys. In the urine it exists in the state of a combined sulphur acid. Applied to the skin it produces a sensation of burning, and to mucous surfaces it is slightly caustic. The slight pain which follows its use quickly passes off, usually in 2—4 minutes. Painted on the skin of febrile animals it exerts an antipyretic action, due, according to the authors, to cutaneous absorption of the drug.

Considering the physiological effects of the drug, and its weak toxic power (especially compared with guaiacol), the authors think it worthy of an introduction into therapeutics, and suggest it as a remedy in tuberculosis. For internal use they recommend it to be given in capsules.

LANGLOIS (P.) et MAURANGE (G.). "On the utility of injections of oxy-sparteine before chloroform anæsthesia."—*Comp. Rend. de l'Acad. des Sciences*, July 29, 1895, p. 263.

IN a note to the Société de Biologie (July 7, 1894), the authors proved the tonic influence of sparteine on the heart of subjects under chloroform narcosis. They showed that the cardiac troubles so often observed during anæsthesia were, if not suppressed, at least markedly diminished. Hurtle having demonstrated that oxy-sparteine exercises a still more energetic action on the heart than sparteine, the authors renewed their researches with the chlorhydrate of oxy-sparteine, and, as a result, they have substituted this for sparteine in practice. Oxy-sparteine diminishes the excitability of the vagus (but not so markedly as atropine), and maintains the blood-pressure. The experiments of the authors show that in the deepest narcosis the fall of blood-pressure is much less after previous injection of oxy-sparteine than under ordinary conditions, and they also prove the oxy-sparteine-morphine combination to be more efficacious than that of morphine and atropine. These experiments were further confirmed by the observation of 210 cases of chloroform anæsthesia, in which sparteine or oxy-sparteine was used. An hour before operation the authors inject 4—5 cgs. ($\frac{2}{3}$ gr.) sparteine or 3—4 cgs. oxy-sparteine, with 1 cg. ($\frac{1}{8}$ — $\frac{1}{7}$ gr.) morphine. They state that by so doing they subsequently obtained rapid narcosis, easy to maintain, with comparatively little chloroform. The heart-beat remained regular and energetic, even when the respirations became superficial. In operations of long duration they sometimes made a second injection of sparteine alone, about an hour after the commencement of the anæsthesia.

C. R. Marshall.

"New treatment of epilepsy."—*Journal des Praticiens*, July 13, 1895.

M. V. DE BECHTEREW, of St. Petersburg, recommends the following formula in cases of epilepsy:—

Leaves of adonis vernalis.....2 to 3·75 grammes.

Boiling water 180 grammes.

Make an infusion. Add—

Bromide of potassium 7·5 to 11·25 grammes.

Codeine.....12 „ 18 centigrammes.

The dose is four to eight tablespoonfuls per diem in water or sweetened milk.

Dr. de Bechterew has never seen a case of epilepsy absolutely refractory to this treatment, the fits invariably disappearing or diminishing markedly in number. He explains the result by the constrictive action of adonis vernalis on the capillaries in general and the cerebral capillaries in particular.

"Treatment of acne."—*Atlanta Medical and Surgical Journal*, July, 1895.

DR. WOLFF recommends the following sulphur lotion:—

R. Zinci sulphat	} aa 5 i.
Potass. sulphid.	
Sulph. precip.	
Aquæ rosæ	3 ij.

To be applied every night after washing the face in tepid water, to which borax may have been added. If this does not remove the eruption, the following salve may be used at night:—

B. Hydrarg. bichlorid.	gr. i., vel ij.
Resorcin	3 ss., vel j.
Aq. lauro-cerasi.	5 ij.
Farinæ	3 ij.
Lanolin. ad	3 i.

"Inhalations of oxygen impregnated with guaiacol in pulmonary gangrene."—*L'Union médicale*, August 10, 1895.

M. H. RICHARDIERE suggests the inhalation of vapour of guaiacol in pulmonary gangrene to overcome the terrible fœtor which is so pronounced a feature in many cases. He considers the guaiacol acts also on the bronchial secretions, which are always abundant, and that it exerts locally on the gangrenous portion of lung an antiseptic and bactericidal action. He employs an ordinary oxygen inhaler, placing the guaiacol in the washing flask. The patients thus breathe oxygen which has bubbled through guaiacol and is impregnated with the vapours of this substance.

Atmospheric air may be used instead of oxygen, but the author considers the latter often fulfils an important indication where a considerable portion of lung tissue has been lost.

"Treatment of chapped hands." *Journal des Praticiens*, July 6, 1895.

THE following formula is in use in Germany:—

Menthol	0·75 centigrammes.
Olive oil	} aa 1·5 grammes.
Salol	
Lanoline	45 grammes.

To be applied to the parts affected twice a day.

Pathology and Bacteriology.

UNDER THE CHARGE OF A. SHERIDAN DELÉPINE, M.B., B.Sc.

PREVALENCE OF TUBERCULOSIS IN THE DOMESTICATED ANIMALS.*

THE more do we learn about tuberculosis the more are we bound to consider it as, perhaps, the most universal disease, both with regard to its pandemic and its panzootic character.

Not only does it affect man and a very large number of other mammals, but numerous observations and experiments have proved that, when external conditions are favourable, the lower vertebrata may also become infected. From a public health point of view, the prevalence of tuberculosis among the animals which man has associated by domestication with his every-day life, has the greatest possible interest.

The flesh and milk of several of them constitute the most important elements of the food of a large proportion of mankind. Their hides, bones, blood, excrements, are used for various purposes, and must come in contact with a number of people. We mix with these beings in our thoroughfares, and even in our houses; and in certain parts it might almost be said that they are the bedfellows of men, women, and children.

If it be remembered that tuberculosis has abundantly been proved to be transmissible from the lower animals to man, and from man to the lower animals, either through the air or food passages, and also, but more rarely, through the abraded skin, or the genito-urinary passages, this promiscuity cannot fail to convey an impression of insecurity.

It is not my object here to speak of tuberculosis in such animals as monkeys, camels, giraffes, antelopes, llamas, lions, tigers, foxes, tapirs, zebras, etc., all of which have, when kept in menageries, been found to be liable to tuberculosis. My remarks will be limited to those domesticated animals that are most constantly associated with man in this country.

Several of them have, for a long time, been supposed to be immune against tuberculosis, and many are still believed, not only by medical men, but also by veterinary surgeons, to be refractory. I need only mention the horse, the goat, and the dog, in support of my contention. Many attempts of serum treatment of tuberculosis have been and are still based on such belief, so that nobody can deny the tenacity with which the notion has been retained.

* Abstract of an Address delivered before the Lancashire Veterinary Association, by Sheridan Delépine, Professor of Pathology, The Owens' College.

In the last few years I have often in private argument combatted this erroneous view, and this I have been able to do on the basis of personal experience, for I have had many opportunities of investigating cases of tuberculosis in nearly all the domesticated animals, with the exception of the sheep, and but few of these cases have been brought to me under the impression that they were instances of tuberculosis.

It must be admitted that the disease is much rarer in some kinds, such as the goat and the sheep, than in others, among which I may mention the ox and the pig, but even this relative immunity may be more apparent than real, for,

(1) *Some animals are, by their mode of life, less exposed to infection than others.*—Thus, cows, kept in the ill-ventilated, insanitary byres or dairies of large towns, are exceptionally liable to the disease, whilst sheep and goats, which are usually kept in the open, run hardly any risk of infection. Swine, fed on uncooked tuberculous offal or milk, are undoubtedly more exposed to infection than horses kept on fodder, which by its nature can under ordinary conditions be considered free from tubercle bacilli. (Foals, calves, goats, and kittens, fed on uncooked tuberculous milk, become tuberculous, just as the pig would under the same circumstances.)

(2) *The lesions produced by tuberculosis do not present the same appearances in all animals.*—Their distribution, being determined by the channel by which the bacillus penetrates the body, is different in animals which are usually infected through the alimentary canal, and in those which are attacked through the air passages. The pulmonary and peritoneal lesions in cattle have long been known under the names of grapes, pearl disease, perlsucht, etc., and have early been attributed to tuberculosis, whilst in the horse the extensive lesions produced in the spleen, though long known under the name of lymphadenoma, have only been lately correctly interpreted. In fact, in the horse large masses of lymphoid tissue, growing in connection with mesenteric and retroperitoneal glands, are often still supposed to be sarcomatous, though, by careful examination, it can be shown that they are inflammatory, and harbour an immense number of tubercle bacilli. The same difficulty may occur in man, but I must own that in some cases of human lymphadenoma, which, from a naked eye and microscopical examination, I believed to be tuberculous, I have been unable to prove the presence of tubercle bacilli. In other cases, however, I have shown that lesions which seemed at the post-mortem examination to be lymphadenomatous were actually tuberculous.*

* There is, in the St. George's Hospital Museum, London, a spleen showing how difficult the diagnosis is when a naked eye examination is the only guide. This spleen, which I examined about eight years ago, and which I found to be tuberculous, has more than once been re-examined by others under the impression that it had been wrongly labelled.

(3) *Different animals react differently to the experimental inoculation of tuberculous products.*—Observers who have used only one method of artificial infection have been led to attribute undue weight to the differences which they have observed. The rabbit and the guinea-pig are both very liable to tuberculosis, and do not show much difference when infected through the lungs, but subcutaneous inoculation gives rise in the guinea-pig to a much more extensive and regular infection of the lymphatics than it does in the rabbit.

These sources of error have become less important of late, for it is now easy, by the inoculation method, by the demonstration of tubercle bacilli, or by the application of the tuberculin test during life, to determine whether an animal is or was suffering from tuberculosis.

Statistics collected during the last few years by such men as Jöhne, Bang, Lydtin, Ostertag, Arloing, Nocard, MacFadyean, and others, can, therefore, be taken as a good basis for estimating the prevalence of tuberculosis. It is chiefly on the work of these observers that I have relied for the figures given in the following lines; my own experience, being of a fragmentary character, has only served me as a guide in the interpretation of the statements made by others.

CATTLE are, with man, the mammals the most liable to tuberculosis.

By putting together a few of the figures collected in England, France, Germany, Denmark, and Holland, and giving the number of tuberculous animals in over 600,000 heads of cattle, it is found that more than 16 per cent were affected. One is certainly not far wrong in saying that out of every 10 cows one or two are certainly tuberculous. Yet this statement must be qualified, for there are districts in which tuberculosis is almost absent, whilst in others it is so very prevalent that a non-tuberculous cow is the exception. This is specially true of large towns, where milch cows are often kept in infected dairies. In such dairies, three to six, seven, or even eight cows out of ten are tuberculous, statistics to that effect having been collected not only in France and Germany, but also in England and Scotland.

The ways in which these cows become infected are evident enough if the distribution of the tuberculous lesions is kept in mind. The air passages and the alimentary canal are undoubtedly the paths through which the bacilli generally penetrate into the organism, either with contaminated air or with contaminated food. Infection through the genito-urinary tracts, the udder, the skin, though possible, is undoubtedly of rare occurrence.

It is evident that infection in most cases takes place after birth, the supposed great share of heredity is now more than doubtful, at least in the old sense. Nothing is more convincing in this respect than the

statistics relating to the prevalence of tuberculosis in calves. From returns obtained chiefly in Germany, Denmark, and France, and based on the examination of more than $2\frac{1}{2}$ millions of calves, it may be said that not more than 0.03 per cent are affected, i.e., that not more than 3 calves out of 10,000, or roughly speaking 1 in 3,300, are tuberculous. From certain statistics collected in Saxony it would seem that however small the number of tuberculous calves is, that number is gradually increasing.

SWINE are not generally supposed to be very liable to tuberculosis, but we have more and more evidence to show that this is not a correct impression. Most German returns show that at least one pig out of every 100 is affected with tuberculosis, and in some cases one pig out of 60. In Saxony the percentages were in 1891: 1.07, in 1892, 1.37, and in 1893, 1.64, a gradual increase similar to that which has already been noticed in connection with cattle. By putting together statistics collected in Germany, Holland and France, and relating to nearly one million pigs, one gets a general percentage of 0.85, but some of the percentages given, especially in France, are suspiciously low. By adding to these figures some German and some unusually high Danish returns, quoted in the recently issued Report of the Royal Commission on the effect of food derived from tuberculous animals, a higher percentage is obtained, viz., 2.75, based on the examination of nearly one and a half million pigs. From this it would appear that one pig out of every 36 might be tuberculous. If it is remembered that in certain countries much pork is eaten, salted, or smoked, but uncooked, the importance of tuberculosis in swine will become apparent, for neither smoking or salting can be relied on for killing the tubercle bacillus.

In the pig the infection generally takes place through the alimentary canal. Young pigs fed on tuberculous milk or other tuberculous products are extremely readily affected, as proved by several experimenters since Chauveau in 1868. Hence the danger of throwing to the pigs uncooked tuberculous milk or offal, as is not unusually done. Nocard believes that nine out of ten cases become infected through the alimentary canal. This is supported by the distribution of the tubercular lesions, which affect chiefly the whole of the lymphatic ganglia connected with the alimentary canal from the mouth to the large intestine. The liver and spleen are generally involved, but the serous membranes are much less affected than in cattle. The lungs are often riddled with miliary tubercles, a result of general infection.

Calcification of tubercle is much less frequent in swine than in cattle. Chronic affection of the glands of the neck and of the bones give rise to what has been described under the name of pig's scrofula.

In the HORSE numerous instances of tuberculosis have been put on record, yet the animal, as I have already said, is still often thought to possess a special immunity against tuberculosis. There is no sufficient basis for any estimation of the percentage of horses affected. From the way in which the thoracic and the abdominal organs are affected it seems certain that infection may take place either through the air or the food passages. But the bacillus must generally enter the body through the alimentary canal. What is specially remarkable about tuberculous lesions in the horse is the extraordinary proliferation of lymphoid tissue which is associated with them. The appearance of the spleen is characteristic, and has already been alluded to, the mesenteric and sublumbar ganglia not uncommonly reach a considerable size, and may be cheesy or fleshy, resembling in the latter case sarcomatous masses. Several cases of this kind have been referred to me as instances of tumours occurring in the horse. The liver may be affected like the spleen, and is usually the seat of cirrhosis. The lungs are often the seat of miliary tuberculosis. In these lesions the number of tubercle bacilli is at times extremely large. There is ground to believe that tuberculosis is more frequent in the horse than it used to be, and this is probably connected with the custom which has become prevalent in some districts of bringing up foals on cows' milk.

In the SHEEP tuberculosis is undoubtedly rare. Taking the Danish and German statistics as guides, it would appear that not more than 11 sheep in 10,000 can be expected to be tuberculous under ordinary circumstances; in fact, this figure is too high, owing to the probable errors caused by various pseudo-tubercloses. The proportion attacked is possibly much smaller than the one just given, being probably seldom above three in 10,000, and often much less.

The GOAT, the supposed special refractoriness of which is taken as the basis for a method of serum-therapie for tuberculosis, has also been found not to be immune. Not only can it be infected experimentally, but several instances of non-experimental tuberculosis have been described by several observers; one case examined by McFadyean has been on record for several years now. In several instances the tuberculosis has been acquired by cohabitation with tuberculous cows or feeding on cows' milk.

Instances of tuberculosis in the DOG and CAT are becoming more and more frequent in our pathological records, and several instances of mesenteric or pulmonary tuberculosis in these animals have fallen under my own notice. These animals undoubtedly often become

infected owing to their living in the houses of tuberculous human beings, but in their turn they become dangerous to those who make pets of them, and specially to children.

Regarding tuberculosis in BIRDS, it is important not to be too much impressed by the differences between avian and human tuberculosis. We have to deal here only with varieties of the same bacillus, and as we know little of the conditions under which the tubercle bacillus lives saprophytically, it is impossible to tell at present whether the avian tubercle bacillus may not at times become a source of danger to man. The facts that in some poultry yards tuberculosis spreads rapidly, and that when the disease has occurred once it is difficult to eradicate, show that avian tuberculosis is a very contagious disease.

In conclusion, I would like to point out that domesticated animals constitute a breeding ground for a bacillus which is one of the most dangerous enemies of man.

Recent observations have shown that there is a tendency towards an increased prevalence of tuberculosis amongst these animals. It is evident that considerations of mere economy cannot much longer prevent the State from dealing actively with such a glaring danger. It is fortunate under those circumstances that veterinary surgeons should in some places have been called upon to assist medical officers of health in the inspection of animals used for food. The special knowledge which a veterinary man can bring to bear on such questions should make it possible for us to arrive before long at a correct estimate of the magnitude of the danger to which we are exposed through tuberculosis. This should be known *not only in a general way but accurately in each district*, and to the veterinary profession, which has already done so much in the past, we are now looking for the information still wanted.

Reviews.

"Early Scoliosis or Curable Curvatures of the Spine." By PERCY G. LEWIS, M.D., M.R.C.S., L.S.A., A.K.C. London: John Bale and Sons, Great Titchfield Street. 1895.

IN these days of physical culture for girls, probably spinal curvature of the type specially referred to in this little book, is not such an important subject as earlier in the century.

Perhaps, for that reason, the average practitioner has given it less attention than it deserves. To such Dr. Percy Lewis' book will be useful and valuable.

After speaking of general anatomical considerations, the author refers to the etiology and pathology of scoliosis. He attributes it to general weakness following illness, or too rapid growth. This general weakness leads to the assumption of bad positions—stooping, standing more on one leg than on the other, writing at too high a table, crossing the legs, etc. The result is weakening and stretching of some muscles and shortening of the opposite muscles, and gradual twisting of the spine. A slight curvature once produced, the tendency is for the deformity to progress rapidly.

The fundamental principles of treatment, according to Dr. Lewis, after general tonics, fresh air, etc., are avoidance of the bad positions leading to the deformity, and gymnastics carefully adapted to strengthen and shorten the lengthened and weakened muscles. This section is well and clearly written, and illustrated by several cuts, showing the author's methods in practice.

As regards instruments, Dr. Lewis rightly considers that they are useful in incurable curvature and caries; but, if a case is curable at all, it can be treated much more successfully without instrumental appliances.

"Indigestion: An Introduction to the Study of the Diseases of the Stomach." By GEORGE HERSCHELL, M.D. London: Baillière, Tindall, and Cox. Second Edition. 1895.

IN this book Dr. Herschell has succeeded in bringing before the profession, in a clear and interesting manner, a large amount of useful information in regard to the very important group of diseases whose cardinal symptom he takes for the title of his work.

He does not profess to supply a complete treatise on the disorders of the digestive apparatus, but he brings before us the results of some of the latest researches on diseases of the stomach, and especially those, which by the frequency of their occurrence, are of the greatest importance.

After giving an account of the process of normal digestion, the author discusses the term indigestion, and mentions the conditions under which it occurs. He divides these into—(a) Alterations in the relations of food to the organism. Under this head he very properly lays emphasis on imperfect mastication, improper arrangement of meals and injudicious admixture of foods, the so-called "high tea" coming in especially for condemnation. (b) Primary affections of the stomach, gastritis, ulcer, cancer, etc. (c) Secondary affections of the stomach, including those occurring in neurasthenia, and in the course of other diseases.

Dr. Herschell then goes at great length and very minutely into the mode of interrogation and the physical examination of the patient. In

this section he includes also estimation of the absorptive and motor power of the stomach, and examination of the stomach contents.

Chapter V. contains an account of the etiology, symptoms, and differential diagnosis of the chief diseases of the stomach, whilst Chapter VI. is taken up with treatment—including diet, digestive ferments, lavage, electricity, massage and drugs.

In regard to diet—Dr. Herschell justly enters a protest against forbidding an article of diet unless there is a distinct reason for its withdrawal; and, in another section of the book, he points out how restriction of the diet, if carried too far, leads to constipation and other evils.

The author seems to have a very much more favourable opinion of electricity as a therapeutic agent in gastric disorders, and to have obtained much better results by its use than other writers.

The last chapter of the book is devoted to a series of illustrative cases for commentary and diagnosis, intended for students to solve.

A well arranged and extensive bibliography is appended.

The publishers may be congratulated on the printing and general get-up of the book, which leave nothing to be desired.

Local News.

In the list of candidates for Her Majesty's Indian Medical Service, who were successful at the competitive examination, held in London on August 2, 1895, the first place was gained by W. W. CLEMESHA, and the third by V. E. H. LINDESAY, both of whom were students of the Owens College. Thirty-eight candidates competed for sixteen appointments.

At the Intermediate Examination in Medicine of the University of London, July, 1895, ROBERT KELSALL, a student of Owens College, obtained a gold medal in Physiology and Histology.

R. W. INNES SMITH, M.B., has been appointed Assistant House Surgeon to the Ancoats Hospital.

The Manchester and Salford Hospital for Skin Diseases, which has been situated in Dale Street for the past ten years, has now been removed to a large house in Quay Street. The new premises afford improved accommodation for the treatment of out-patients, and will also admit of the provision of a few beds for in-patients.

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